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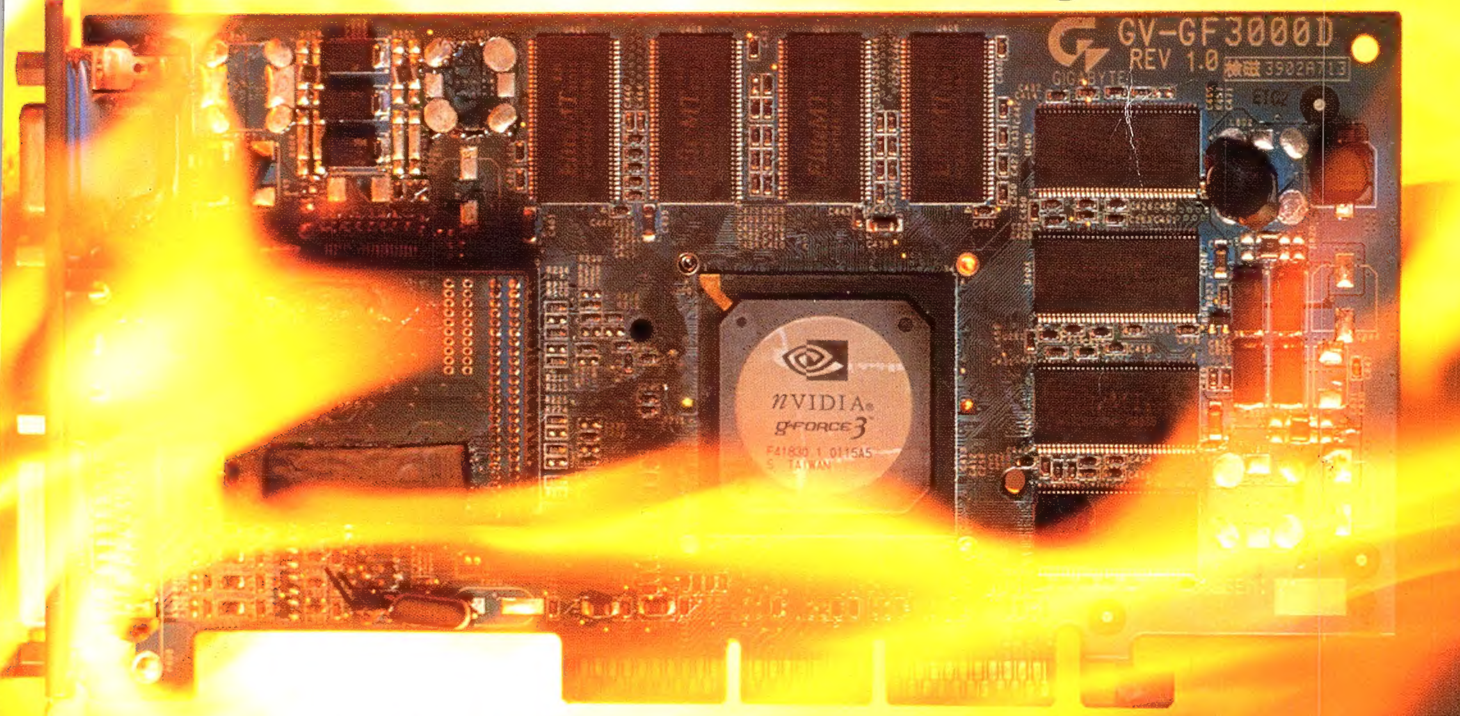

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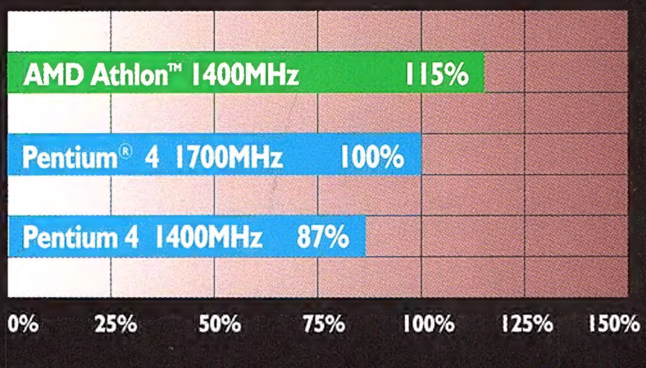

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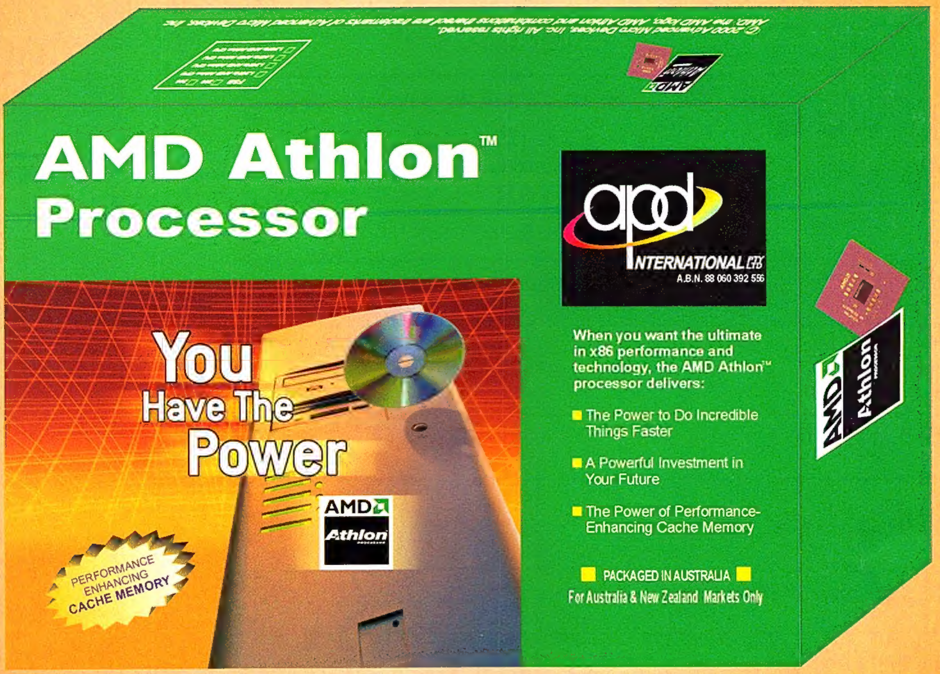
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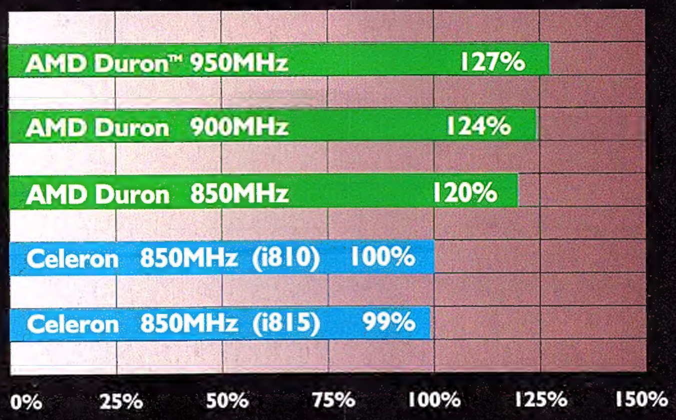

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With the release of Windows XP, it's time to go on an OS giveaway spree. This month we've got $12,000 worth of XP packs for five lucky readers, each containing a copy of Windows XP Professional, Office XP Professional and Visio Standard. We've also got a GlobalWIN WBK-38 and an Alpha PAL6035 heatsink. Turn to page 96 now, dammit – before it's too late!

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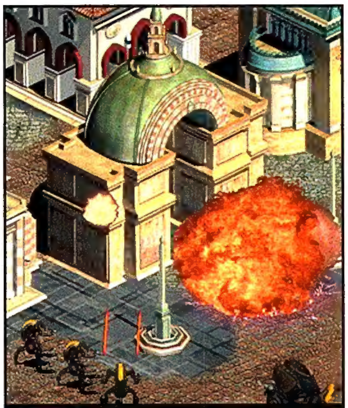
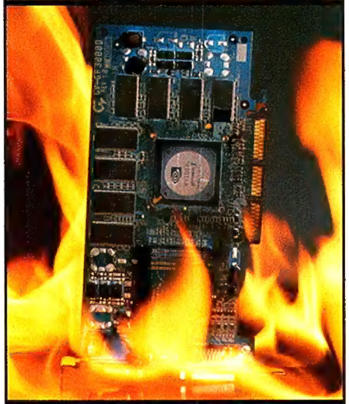
There is only a month left before our subscriptions price goes up, so there is no time like the present to ensure a years' worth of Atomic for ultra cheap. Plus you could win your very own VapoChill refrigerated PC case worth $1,900.





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GEFORCE3 FLAMBÉ

This month's cover is supposed to be a dramatic representation of the perils of video card overclocking in a really, really worst-case kind of scenario. Bennett put together a nice overclocking and tweaking guide for this issue, and when it came to illustrating the concept the only viable option seemed to be to burn a card for real – a GeForce3 – if we were going to do the job right. At that point enthusiasm for the project overtook careful planning, and we then decided that instead of just burning a GeForce3, we really should explode it, or shoot it with a gun, or something. Obviously.

'C'mon boys, now you're just being silly'. Thanks, Katey. 'Why won't you let us have any fun?!', we all wailed. 'Burning it is okay. It's sort of relevant to the article', the anti-fun queen conceded.

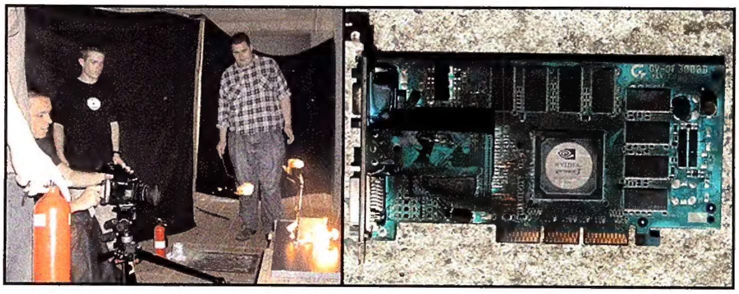
Well, 'sort of relevant' is all we needed. But we also needed a GeForce3 to char-grill. Luckily the Gigabyte card that we'd surgically overclocked in Atomic 8 was available. When trying to reclaim our 3DMark world record we found that our modded voltage of 1.78V wasn't enough, so we pushed it to 2.15V. And broke it. The card, not the record. It sort of worked, but pressing was the need to sort of burn one into a black sooty lump. From that point on the card was condemned.

Now it was time to get scientistic about it all. John is the Atomic Staff Scientist, being a trained geomorphologist, which, he tells us, has something to do with nth-dimensional paradoxicalysm. He reckoned that either napalm or plain old lighter fluid would be the accelerant of choice. He also strongly recommended staging a properly conducted live test first. We were cool with burning two things instead of just one, so an AWE32 was located. The AWE32 is the most closely related card to the GeForce3, in terms of technical compatibility, combined with similarities in usefulness in both pre- and post - combusted form.

After discussing at great length how we were going to either make or obtain our own napalm, John decided to walk a block to the tobacconist and buy five cans of Zippo Premium Lighter Fluid instead. That night, in the car park, with 20 enthusiastic assistants, we discovered that Zippo juice, if applied liberally and frequently, gave the desired 'all-over' flame effect. We also discovered that capacitors explode when they burn.

The next day, wearing our new protective goggles, it was happy burning time. The boys were armed and ready with fire extinguishers that didn't work, because the day before they thought it would be funny to squirt cold powdery stuff all over Kate to scare her, and hadn't realised that a fully charged extinguisher only lasts for seven seconds. Still, they looked great, all serious and responsible, ironically. And miraculously, it all worked as planned. Thirty seconds of burn time, 24 photos and one carbonised GeForce3 later, we had our cover girl. I think you'll agree, she's a hottie.

Ben Mansill, Editor



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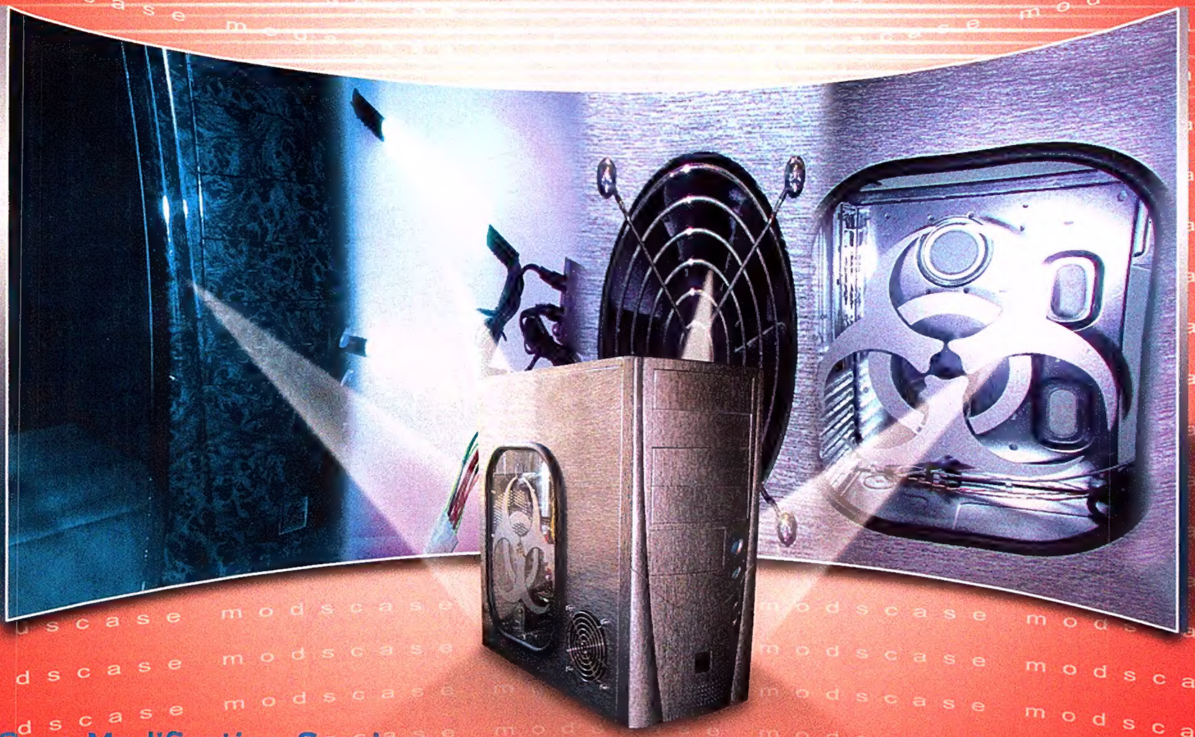

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Short Circuits

- Linux users rejoice! Yet another 'feature' of Windows is available on any Linux-based platform. After years of holding a monopoly stranglehold on the virus market, Windows is now running scared after revelations that it has new competition, in the form of Wine support for the Sircam virus. Wine (Wine Is Not an Emulator) was developed in order to provide a 'compatibility layer' for Win32-based binaries on Linux and other Unix platforms. However, the best is yet to come. Due to the way Wine works, Sircam is unable to create Registry entries, thus it is prevented from infecting the Linux-based host machine. The end result is that, even though Linux can run Win32-based viruses, these viruses have absolutely no malicious affect on the machines running them.

- Napster, once the ultimate in online music sharing, has taken a major step toward its goal of becoming a legitimate online music distributor. The company has settled lawsuits originating with music publishers and songwriters, for a sum of $US26 million. Included in the settlement was an agreed extra payment of $US10 million in advance music royalties. However, before the settlement can go ahead, it must be approved by all the individual publishers involved and also by the American Federal Court, a process that may take several months. Despite this, Napster is not yet out of the woods, as lawsuits from several major record labels continue. Regardless of the outcome, jilted Napster fans remain unconcerned; they've discovered the wonderous joys of peer-to-teer file sharing.

Battle of the Titans

Intel has, unsurprisingly, launched a series of new patent infringement lawsuits against Taiwanese chipset manufacturer VIA. The lawsuits have been filed in Hong Kong, Germany and the UK and variously name VIA, motherboard manufacturing powerhouse Elitegroup Computer Systems, Realtime Distribution and TREND electronics (HK). The suits refer to a swag of European, German, British and Hong Kong patents.

These new allegations not only name the P4X266 chipset, but also the C3 processor. This seems to be a direct reaction to VIA's lawsuit against Intel, which accused the company of infringing on a patent that is jointly held by both VIA and Centaur (a wholly owned subsidiary of VIA).

The suit, filed in the Federal District Court of Texas, cites the Intel Pentium 4 family of processors as breaching VIA's US Patent Number 6,253,311. The patent concerns different formats used to store numeric data in microprocessors.

Both VIA and Centaur want the court to deliver a ruling that would not only stop the sale of Pentium 4 processors, but also extract monetary compensation from Intel for both VIA and Centaur. It is therefore unsurprising that Intel's countersuit now involves the C3 processor.

VIA's initial lawsuit was filed against Intel in early September, accusing the chip maker of patent infringement, anti-competitive behaviour and wilful destruction of VIA property in reference to the removal, by Intel, of balloons bearing the VIA logo from the Computex exhibition hall earlier this year.

This first lawsuit was filed in response to an initial suit filed by Intel alledging patent infringement by VIA. The offending product at that point was only VIA's P4X266 chipset, which is not officially licensed to use certain Intel technologies. These are needed to make the chipset work with the Pentium 4 processor. VIA alleged that it is licensed due to its S3 joint graphics venture with SONICblue.

Even though both companies are not unaccustomed to lawsuits, the scale of these suits is astounding. From VIA's point of view the threat of injunction against the sale of the Pentium 4 would be counterproductive (if the Pentium 4 was withdrawn from sale, how on earth could anyone ship any Pentium 4 motherboards?). It seems that it is going for the Intel jugular.

VIA's aggressive attitude belies a strong confidence in its case, because as we all know, the one company in the hardware industry that you don't screw with is Intel.

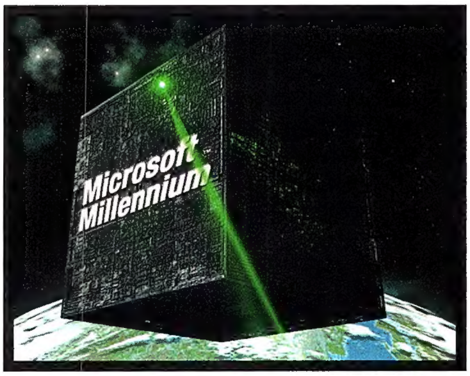
Scorching graphics performance

Owners of motherboards based on i845 or i850 chipsets, beware! Installing a graphics card into your beloved board that does not support 4x AGP will render instant death to the onboard memory controller. The problem arises when cards using 2x AGP (which runs at 3.3V) are wrongly keyed for 1.5V. This makes it possible to insert certain 2x AGP cards into the AGP ports on i845 and i850 boards. When the power is switched on, the increased voltage fries the 82845 memory controller hub, rendering the motherboard useless. Some of the cards that will fry your shiny new Pentium 4 motherboard include:

- all SiS 305- and SiS 6326-based graphics cards;
- Voodoo3 graphics cards;
- graphics cards using Savage4 chips with revision numbers before 3.0; and
- all NVIDIA Vanta-based cards.

If you are unsure whether your graphics card could potentially fry your Pentium 4 board, check the card's manual to see if it supports 4x AGP. If 4x AGP isn't mentioned, it would be best if you used a different graphics card. Or, you could use it anyway and be up for $400 to buy another i845.

The Microsoft vision



Researchers working at Microsoft Research Division have released a position paper entitled 'Operating System Directions for the Next Millennium', that details the direction of Microsoft operating system development for decades to come. The paper focuses on a system called 'Millennium', the focus of a project aimed at creating a gigantic, online distributed OS that fits together so seamlessly, that 'logically, there [is] only one system.'

Millennium is .NET writ large. It is the step after .NET in the Microsoft OS evolutionary timeline. Microsoft aims to create an operating system that 'raise[s] the level of abstraction . . . so that individual computers, file systems and networks become unimportant to most computation in the same way that processor registers, disk sectors and physical pages are today'.

Some of the more interesting goals stated in the Millennium position paper include:

- 'Worldwide scalability': new machines (effectively, network nodes), networks and resources are 'assimilated' into the whole (the Borg imagery associated with the use of that word is too delicious to be plain coincidence).
- 'Location irrelevance': objects can invoke and reference each other irrespective of where their binaries are located. If a piece of code in China references a binary stored on your network, Millennium can run the Chinese code just as easily as if all the needed components were stored on the same node. Naturally, administrators can restrict access to certain places on their networks they deem too sensitive to be used by certain aspects of Millennium such as locational irrelevance.
- 'Storage irrelevance': there is no storage hierarchy; information is accessible from anywhere, regardless of which node is storing the information. The entire system will have a seamless look and feel, despite its underlying distributed nature.

Microsoft researchers know the task they are attempting is monumental, and they acknowledge that they may not be successful in their initial attempts. However, Microsoft is confident that 'the time is right for radical experimentation'. If you are of the same opinion, you can read more at http://research.microsoft.com/research/sn/Millennium/mgoals.html.

PunkBuster bluffs valve – and wins

PunkBuster (PB), makers of the widely used anti-cheat program of the same name, recently announced that it will no longer support products from game company Valve, including Half-Life (HL) and all HL mods – the popular anti-terrorist game Counter-Strike (CS) being chief among these.

In an official statement, PunkBuster stated the only way to further reduce cheating in Counter-Strike would be to integrate support for the PunkBuster client directly into HL/CS clients. Despite a number of attempts on the part of PunkBuster to negotiate official Valve Software support for its program, Valve has continually refused to include PunkBuster integration in its games.

PunkBuster, which has also revealed that it's very close to releasing PB as commercial software, said it will now concentrate on supporting new, as yet unreleased games. However, no mention was made of precisely which games PunkBuster would support.

However, don't despair just yet. After announcing PunkBuster's imminent commercialisation, four game developers – including Valve – contacted the PB team, interested in 'the possibility of integrating [PunkBuster] anti-cheat software technology into their products'.

Hopefully, PunkBuster will manage to elicit support for PB integration from these developers, in both current and future games.

If PunkBuster cannot get the levels of support it needs, PB servers could soon become an endangered species. If this occurs, we pray that some of you manage to retain your sanity amid the inevitable avalanche of 'I Own j00 4||' cries flooding CS servers the world over. Fingers crossed.

Short Circuits

British company Morpheous has released a GPS-based radar detector by the name of Geodesy, which works by comparing GPS data with a proprietary database. Once Geodesy knows where it (and, by extension, you) is, it compares your position against an internal database of fixed radar camera locations. To keep the Geodesy up to date, a modem is available that allows you to connect to the central database of radar trap locations (updated daily) and download the latest additions. Still not convinced this is a great product? The Geodesy also includes a feature that allows you to submit new radar trap locations at the press of a button, which not only helps to keep the database up to date, but also earns you a £50 cheque from Morpheous! Currently, the device is available only in the UK while Morpheous looks for overseas distributors.

Gartner Group recommends that businesses replace Microsoft's Internet Information Server (IIS) in favour of Web servers from other vendors, including Apache, due to frequent security breaches causing the Total Cost of Ownership (TCO) to rise dramatically. Gartner points out that, despite the high release frequency of patches for IIS, worms and viruses such as Code Red and Nimda continue to attack and compromise IIS-based servers on a regular basis. Gartner advises that IIS will not become secure until Microsoft releases a new version that has undergone extensive and thorough public testing. Gartner Group estimates that there is only a 20% chance of this being carried out before the end of 2002.

ISPs take action on virus traffic

After putting up with massive traffic spikes from Code Red, Code Red 2 and Sircam viruses, ISPs both at home and in the US have taken action to stop large amounts of traffic originating from infected machines run by their customers.

While some US ISPs were cautious in their approach, emailing warnings to their infected customers before taking actions such as blocking incoming port 80 connections, others such as Speakeasy took a harder line. Speakeasy, a large Seattle-based ISP that specialises in DSL (Digital Subscriber Line) services, sent an email regarding Nimda to all of its customers. Part of the email advised that 'Speakeasy's Abuse Team will be freezing the DSL circuit hooked to any machine infected with the worm'. The email then informed customers that the only way to reactivate their frozen DSL service was to contact Speakeasy tech support and have it manually enabled.

Local ISP responses to Code Red, Sircam and the like have been varied. Telstra issued an email warning to its customers concerning Nimda, prominently stating that Telstra was not responsible for the virus. The email also claimed that 'network controls [have been] implemented by Telstra . . . [which] have already prevented several thousand attempts to spread the worm'.

Optus took a different approach to controlling virus and worm-related traffic, blocking all incoming HTTP connections on its network. This elicited a number of angry responses from Optus@Home customers, but as Optus pointed out, running Web servers off Optus@Home cable connections is against the Acceptable Use Policy that Optus@Home customers agreed to when they signed up for the service, thus customers shouldn't have been running Web servers to begin with.

While ISPs finally seem to be taking action against worm traffic, these preliminary moves raise some interesting questions. If an ISP takes action to block certain types of illegal network traffic, are they legally bound to continue doing so? Most ISPs maintain that they are simply conduits of data and therefore not liable for the contents of said data – much as Australia Post is not liable for the contents of packages it delivers. Also of note is the much debated question of who is responsible for paying for unwanted worm and virus related traffic.

Of course, we couldn't let a question like that stand. Atomic contacted Telstra for clarification on its excess usage policy in regards to virus traffic. Telstra informed us that customers may contact them regarding excess usage generated by incoming virus and worm traffic, and request Telstra look into the matter. Telstra then compares the customer's usage pattern for that month to their previous three months, and if the customer can justify their claims that a virus or worm such as Code Red caused them to exceed their download allowance, Telstra will consider refunding the excess charges. To date, 20 Telstra customers have been refunded unspecified amounts due to excess traffic generated by incoming Code Red connections.

All we can say is, if you think you are paying for extra usage due to Code Red or any other proliferate worm, grab your log files and call Telstra. ○

Motherboards 'r' us

Khai Huynh, manager of BBOS Computers in Sydney, has pulled off a bit of a coup. In late October, a new type of PC hardware store opens its doors. BBOS Computers has teamed with Creative Labs and Achieva Australia, a distributor of ASUS gear, to showcase the best of its respective products.

Described as the first store of its kind, users will be able to walk in and see first hand the latest range of ASUS and Creative products, as well as samples of upcoming gear. According to Tex Sylaprany from Achieva Australia, the store will provide a hands-on environment with various products set up and operational, not just neatly shrink-wrapped behind a glass-paned counter. Customers will also be able to pre-order products before their official release.

Staff in the store will be specially trained on the products, and they will be able to answer all your tricky technical questions. According to Tex, the main benefit of a store such as this is that the end user will be able to make better informed choices about the products they are purchasing. You won't be subjected to the usual sales drivel that some stores use, but instead will be given correct and detailed answers to every question you could possibly have about any bit of kit in the store.

Should the concept prove successful, the initial trial will be expanded and other showcase stores will be opened around Sydney. ○

Short Circuits

International traffic on the Telstra network was reduced to a crawl recently after two major US-China data cables (China-US and SEA-ME-WE3) were damaged. The fault, thought to have been caused by a ship's anchor, occurred 30km off Shantou on the Chinese coast. Telstra owns a half share in both cables, which carry the majority of Australia's international traffic.

Telstra partly re-routed Australia-US traffic through the Southern Cross Cable, but pings continued to be sky high despite this.

Major record label Universal, a division of Vivendi Universal, was slapped on the wrist by the US Federal court recently after Judge John Martin Jr ruled that a Universal-owned online music service – Farmclub.com – streamed music without holding the appropriate licences from music publishers. The ruling effectively means that music labels are not in control of the songs their artists produce – they must negotiate with all involved parties, including songwriters and publishers, before they can distribute music in an electronic form.

Judge Martin's decision positively smacks of irony, especially when you consider the tendency of music labels to sue anyone and everyone that attempts to distribute music online. Last year, Universal was a primary party in a suit against MP3.com, the popular online music portal. Not only did Universal win the case, it also gained over $54 million equity in MP3.com as part of the settlement. Farmclub, initially intended as MP3.com's direct competition, has now suffered the same fate as its predecessor. Ah, well, live by the sword . . .

Deeper than blue?

The American Computer Company, a research and development company in the US, has sent out press releases saying that it has developed a processor capable of outperforming the CPUs used in IBM's Deep Blue by a factor of 25,000. It claims the processor is capable of running at speeds of 50 terahertz, all while running in a system that takes up one-hundredth of the space that the IBM supercomputer does. If that doesn't immediately knock you out of your chair, you've obviously been totally spoilt by the gamut of new technologies that have been released over the last few years.

While the processor has thus far only had simple instruction sets built into its architecture, enough instructions have been implemented to allow the new processor to perform simple calculator functions.

When calculating such functions accurately and in a single string (most current CPUs run multiple instructions in parallel, rather than simply one after the other), the company claims that each successfully calculated step in the process was executed 25,000 times faster than the same strings of instructions being run via IBM's Power Parallel 6000 processors. Yowsers!

The processor is said to be able to achieve such high speeds through its use of a more 'natural' means of manipulating electrons than IBM's own quantum efforts. IBM's quantum-level processing technology relies on manipulating an atom's electrons in an unnatural way, first slowing and then reversing their flow about an atom. This, the company claims, creates far more heat and requires far more power than its own method, which revolves around using the electron's natural flow about an atom, combined with some more subtle, subatomic manipulations.

This 'tiny programmable calculator', as its inventors are calling it, also takes advantage of another technology the company has created, called Transfer Capacitors (TCAPs). These replace standard transistors and are manipulated much like RAM, but at much higher speeds.

Keep your eyes peeled for more info as, if its claims are indeed true, this could be the next company to break into the processor scene in a big way.

What's HOT	What's NOT
NIMDA No nasty payload, but evil nonetheless	**CODE RED** Patched back into obscurity
WINDOWS XP Win2K for all	**MAC OS X 1.2** 64-bit only?
BRITNEY SPEARS But her music still sucks	**EINSTURZENDE NEUBAUTEN** Their music is still incomprehensible
P4X266 Fast and almost underground	**i850** RDRAM is no longer the only fast solution
PLAYSTATION2 Getting better games and a better price	**XBOX** Delays and supply problems begin already
ANISOTROPY Variety is the spice of life	**ISOTROPY** Same old, same old

Short Circuits

Advanced Micro Devices has announced plans aimed at reducing costs and increasing the profitability of its core business – PC processor and flash memory chip manufacture. The move includes plans to close two Austin, Texas-based fab plants and fire roughly 2,300 people (1,000 in Texas and 1,300 support staff in Malaysia) by the end of 2002.

The two fabs in question are AMD's oldest plants, used on a contract basis to manufacture other companies' chips. Cost savings are expected to be around $125 million per year, which AMD will likely need after recent revelations from Gateway. In a seemingly coincidental choice of release date, Gateway announced that it would be phasing out its Select line of AMD-based computers, on the same day AMD made its shock fab closure statement. Gateway has decided to drop AMD in favour of Intel, hoping to save costs through a simplification of its supply chain.

Rejoice, yet be saddened. Happiness abounds after Sony dropped the price of a PlayStation2 to just $499.95 late last month. Millions of people all over Australia are currently engrossed in delirious celebration, after realising that a PS2 is now within their reach. Well, not really, but the price drop is still significant, knocking roughly $200 off the retail price. At the same time you should feel sorrow for the poor souls who bought a PS2 console before the price drop. Certain Australians are pulling their hair out in mad frustration, as realisation dawns that they wasted $200 because they couldn't kick their early adoption habit.

Ignorance isn't bliss

The politics of computing are becoming increasingly restrictive and uninformed, claims Ashton Mills.

You know what gets up my nose? Profit before people. Power before people. The phrase 'it's just business' that is supposed to vindicate individuals who sacrifice morality. And the obsessive desire for control by dominating corporations that behave in such a way.

But do you know what gets up my nose even more? The fact that you and I, and everyone else in the general public, lets it happen, lets the corporations evolve and even unwittingly condones what they do at times.

Whether you're aware of it or not, your liberties and rights are being slowly eaten away. And the biggest problem is not that they are eroding, but that you don't even know they're eroding, and as a result do nothing to stop it from happening.

We have our own Internet Censorship Bill because our politicians are ignorant about the nature of the Internet, and not enough of us – ignorant on the issue – protested to stop it. The US has the Digital Millennium Copyright Act (DMCA) that was forced through government on the backs of politicians who were paid by Hollywood, and as a result people have been unfairly jailed (check out the Dimitry link, URL listed below). Some ISPs, out of fear of prosecution under the DMCA, have censored the speech of its users, removing news postings or culling Web sites. Scientists have been silenced from sharing research due to the DMCA. In Britain there are now so many security cameras in public places that even small villages have hundreds of cameras lining their streets. Software designed to recognise criminals has already seen an innocent man held in custody.

And people let this happen. You and I, and everyone else.

Why? Because we're ignorant of the issues. The American people allowed government to just roll over onto its back and implement the demands of the entertainment and music industry with the DMCA. It's clearly a questionable law, it's even recently been proven to contradict the United States' First Amendment – the right to free speech – but now it's law. Our Internet Censorship Bill has had but one result – to push business overseas. Does the Net seem any more censored to you?

Links that matter

- **Censorship and freedom of expression in Australia and overseas**
  http://libertus.net/whatsnew.html
- **The Electronic Frontier Foundation**
  www.eff.org
- **Electronic Frontiers Australia**
  www.efa.org.au
- **All about the Dimitry Skylarov case**
  www.freesklyarov.org
- **A good overview of CPRM**
  www.theregister.co.uk/content/2/15718.html
- **A great summary of the big issues including SDMI**
  www.observer.co.uk/business/story/0,6903,480027,00.html
- **EFA's page on the OFLC's review of classification guidelines**
  www.efa.org.au/Issues/Censor/classifrev01.html

My concern is for the future. As a global population our ignorance of our own rights, of the technology we use and of the very nature of our governments has led to things like the above happening with little opposition.

If the entertainment industry gets its way, in the very near future you won't be able to copy CDs for your own use. In fact, what it plans to do is take away the right for you to use your property the way you want to use it – CDs of the future won't work in unsecured players that allow copying. It's called the Secure Digital Music Initiative (SDMI) and it's here now. And if you manage to bypass this, say, by making a copy of your favourite songs on tape for the car, you will be breaking the law. No more fair use or, for that matter, sane laws.

And the same corporations that made SDMI want the same control over your hard drives. If they get their way your new hard drive will be designed such that it won't allow copying of a wide range of 'copy-protected' file formats. This isn't a pipe dream, it too is here now – it's called Content Protection for Recordable Media (CPRM). Already some removable media devices use CPRM.

Ignorance is not bliss. Is this the type of future you want to live in? Make yourself aware of the issues that relate to your rights, to the behaviour of multinational corporations, and the state of our own government. Voice your opinion, don't just sit there idly and let your rights slip away. Don't wake up to find you can't use your own property in your own way in your own home, or can't freely express your opinion on the public forum that is the Internet.

You can start by visiting the Electronic Frontiers Australia link (see 'Links that matter') and submitting a public comment to the Office of Film and Literature Classification. Right now they're looking at reworking the censorship laws that apply to, among other things, games. The deadline is 30 October 2001.

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Dude, where's my card?

Can brand-name PC manufacturers ever compete in the upgrade arena? Tim Dean likes to speculate.

It's time. For an upgrade.

Sure, you are running a GeForce256 DDR and a Pentium III 800MHz along with 128MB of RAM. Sure, you're getting 50fps in Counter-Strike, and Max Payne is still playable at reasonable detail levels.

But you need more. We know your pain. We know you need no less than 100fps in Counter-Strike, and you need to run Max Payne at unreasonable detail levels. Not want. Need.

So what do you do about it? You upgrade. And upgrading is easier today than it's ever been before. You jump online, browse three or four hardware Web sites, make your choices, either punch in your credit card number or cruise down to the store and pick up your new booty. You pop the lid on your case, and with a bit of screwdriver-assisted shenanigans, half-an-hour later and you're packing a 1.4GHz Athlon, GeForce3 and 512MB of RAM.

Now, this is all good and well when you own your own PC, and even better if you have built it yourself. That way, you know what's in there, you know what else you can fit and you know how to install it.

The problem is that you didn't buy the PC. Your parents/sibling/friend/flatmate did, and now, for whatever reason (most likely because you know more about computers than all of them put together – and they can't get near the thing because you are surgically attached to it and your cable modem), you have become the custodian of the PC. Furthermore, the front of the PC features a brand name, the case is non-standard, your OS CD is not a normal Windows CD, it is a system restore utility, and you have a five-year warranty that doesn't allow you to delve into your case. Now things get complicated.

There has been an ongoing debate over whether white-box manufacturers can compete when it comes to putting together a top-notch performance PC, but this is only half the equation. What about upgrading your Compaq Presario or your IBM NetVista or your Dell Dimension? The fact is that there are a lot of branded PCs out there, and a lot of people who want to upgrade them.

Unless you can ensure that your new motherboard will actually fit, and you don't mind risking your warranty, you are very limited in what you can do. Ultimately, this will hurt the brand PC manufacturers, since those that know the value of upgrading, yet want to buy a PC with on-demand technical support and a top warranty, might be more inclined to dispense with these benefits in favour of being able to upgrade themselves down the track.

What to do? I think the brand PC manufacturers have to look at this situation closely, and work on a strategy to make sure that upgrades are integrated into their PC packages.

It would not necessarily be easy, but it would also not be too hard to implement. Think about it. You buy a brand X PC, with specification Y (because at the time, T1, that is all you can afford), but you rest assured that down the track, at time, T2, you can contact company X and choose from a broad range of upgrade options that are proven to work with your existing specification Y. The cost would inevitably be more than buying and installing the components yourself, but in return you have a technician either come out to your home or have the PC picked up and returned a couple of days later, and everything is done for you, worry free. The components are installed, drives set up, everything tested and quality assured, and your warranty remains intact. If something does go wrong during the upgrade, that is the technician's problem and is fully covered under warranty.

Upgrading is also a potentially dangerous business if you do it yourself. It is rare, but I still receive a couple of emails each month where someone has fried their BIOS, corrupted their Windows install or toasted their new graphics card while performing a DIY upgrade. So if you are not 100% confident in your PC surgery skills, and you don't want to risk your investment, you can have the same people who built your PC upgrade it for you.

Ultimately, this is a matter of taste. Devil's advocacy aside, there are definitely advantages to buying branded PCs when it comes to build quality, warranty and labour, and these can be translated to the upgrade process too. Sure it will cost more, but wouldn't it be nice to have the choice? Hard-core DIY isn't for everyone.

In fact, given the recent trends in PC sales, manufacturers would be stupid not to look at the lucrative and ever-growing upgrade market for more business. If it is built into their design philosophy from day one, then it can only ensure they will get more business, not less. I can understand why some PC manufacturers would be reluctant to encourage people to upgrade instead of buying a new system, but times being what they are, the reality of PC sales will soon change their minds.

So now it's up to the big names in PCs to take a look at their business models and decide what is more important. And then, maybe, we won't be asking the likes of Compaq, IBM and Dell: 'Dude, where's my card?' ▢

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A virus to die for

Dan Rutter wonders when we're ever going to get a virus that is entertaining.

Computers provide people with new ways to be ignorant. Ignorant, not stupid. Using a computer can make you look stupid in many ways, not because you're as dense as a neutronium dumpling, but because you just don't know what the heck's going on.

This is only going to get worse, if you ask me. Or better, if you enjoy watching people look stupid.

I was reflecting on this as I decontaminated an interesting Sircam file attachment. Clip off the first 137216 bytes, folks, to get the clean original file from the unfortunate Sircam victim's computer.

I've been disappointed with Sircam, you see. Most virus/Trojan outbreaks only last a week or three. I've only had two Hybris ('Hahaha@sexyfun.net') emails so far this whole year, for example. Those things used to be everywhere. Sircam's a hardy perennial by comparison. Plenty of people's computers are still sending Sircam mail even as I write this, more than six weeks after it first went live.

I've got a broadband Internet connection, so I don't mind being sent giant file attachments by strangers. As long as they're interesting. The problem with Sircam is that the attachments usually aren't interesting. The people who get the bug generally don't seem to have anything revealing for it to send me.

The best dirt Sircam's sent me is a document from a company that helps other companies through receivership. It named a business that hadn't yet announced receivership. I could have gone short on their stock and become part of an insider trading test case, but I didn't.

Apart from that, it's all been dross. Job application letters. University course listings. Video card drivers. A Word document featuring a French Canadian horticultural club director disporting herself on an armchair. Someone's letter to the editor of a local newspaper. A bill of sale from an asphalt paving equipment vendor. A newsletter from a Weavers' and Spinners' Guild. Various spreadsheets, the most interesting of which only contained data about pesticide effectiveness and Minimum Detectable Levels in soil and water.

It's just not good enough. But it will be.

What we need is a competent Trojan writer. Most viruses and Trojans are written by inexperienced programmers who go on to pupate and then emerge as useful members of society. Or as respectable computer criminals, at least. Not the digital equivalent of an arsonist, which is what you are if you write viruses.

Sircam was written in Delphi, fercryinoutloud. No wonder the darn thing's 134KB. I remember when the only personal computer virus in the world fitted perfectly into the boot sector of an Amiga floppy disk, I do. Kids today. I ask you. Where have my pills gone?

Sooner or later some deranged Proper Programmer is going to create an elegantly coded Trojan with a really fun payload. What I'm waiting for is an automatic groupware feature, so that the Trojan can open a person's computer to the world and let anybody read and write its documents.

This is already possible if people get tricked into installing cDc Back Orifice, SubSeven or something similar, but it could be even more elegant.

Windows XP looks promising. Only Windows XP Professional has the full Remote Desktop feature, but both the Professional and Home Edition have Remote Assistance.

Remote Desktop gives you something approaching Back Orifice-style access to a Windows XP computer remotely, and lets you fiddle with things as if you were sitting in front of the PC.

Remote Assistance is much the same thing, but it has to be triggered by sending a request for assistance to someone else via email or instant message. Special file attached to request message, double-click, off you go.

All of this is supposed to be password-protected and encrypted and, like, totally secure, dude. But this is Microsoft we're talking about here. It still releases major applications, time and time again, with buffer overflow vulnerabilities. It'd be like if General Motors kept making cars that could be started with a Paddle Pop stick.

I look forward with avid anticipation to receiving many, many 'MsRCincident' attachments from people with the new BendMeOver.winxp virus, cordially inviting me to have my way with their PC, should I feel so inclined.

In the meantime, though, I'll keep chopping Sircam off the front of the more interesting incoming attachments, and hope for salacious gossip, a murder confession or IfThisGetsOutItCouldBringDownTheGovernment.doc. And I'll keep dreaming of the day I get read/write access to the computer of someone who, as it turns out, has previously been sending me countless messages about how to Get A Credit Card Merchant Account or Enlarge Your Penis Today or Buy Kathmandu Temple Kiff or Be A Millionaire Like Others Within A Year.

It's gonna be sweet. ▢

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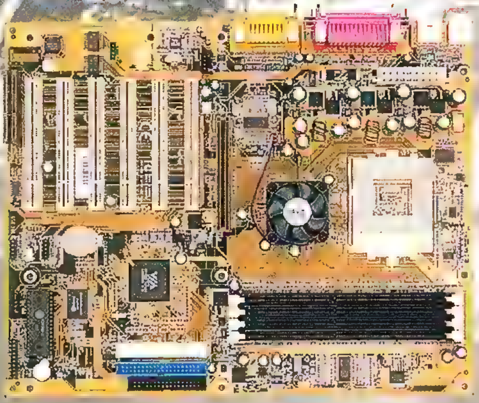

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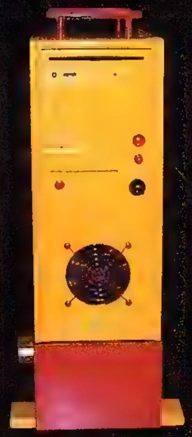
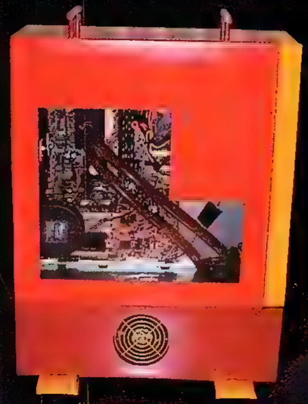
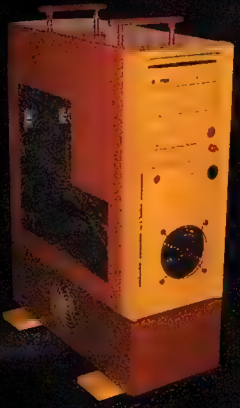
George's glory box







Technical details

- Athlon 1GHz at 1.36GHz
- ASUS A7V 133-C motherboard
- 256MB PC133 at 160MHz
- GeForce3 (235/515)
- FOP38 heatsink
- Game Theater XP
- Two 15GB hard disk drives
- 36x CD-ROM drive
- Phillips 109P 19in monitor
- Water-cooled CPU
- Seven extra fans
- Two neon lights
- LAN handles
- Seven coats of paint

The story

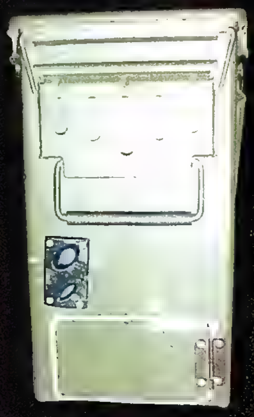
It's all my friend's fault. Once he puts an idea for the PC in my head, that's it!

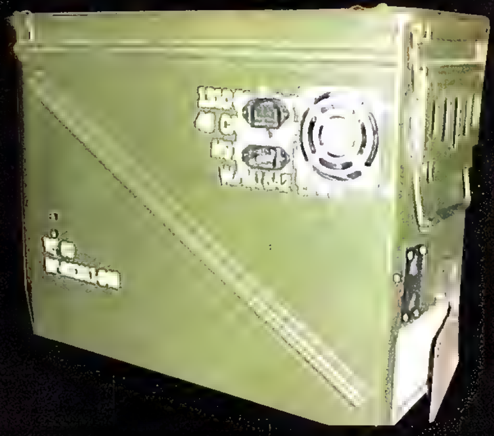
The water-cooling setup undeneath the main case didn't take me very long to do. It's 12mm MDF, which is easy to cut and shape. It just sucks a lot of paint. The pump is in a small reservoir at the front and the radiator is at the back. Two 90mm fans on the right side suck in air and one 90mm extraction fan is located on the left. Even though the radiator is enclosed, the temperature only went up by 1°C. The case is screwed onto the bottom section. Enclosed with the wood, the pump is much quieter now.

The whole setup is so heavy, I had to attach handles so I could cart it around to LANs.

Anyway, seven coats of paint and a huge headache later I'm thankful that it's finally finished. I'm not in a rush to do anything else to it, believe me!

Prophetek's heph





Technical details

- Duron 800MHz
- AOpen MK33 motherboard
- 128MB PC133 SDRAM
- Quantum Fireball 20GB HDD
- Sound Blaster Vibra 128
- Pioneer 16x DVD-ROM drive
- Kodak 2x CD writer
- Sparkle TNT2 32MB TV-Out
- A4 Tech cordless radio mouse
- FlyVideo 98 capture card
- Ex-army ammunition case
- Dedicated MP3/DivX -;)
- Probably bulletproof
- Hell tough

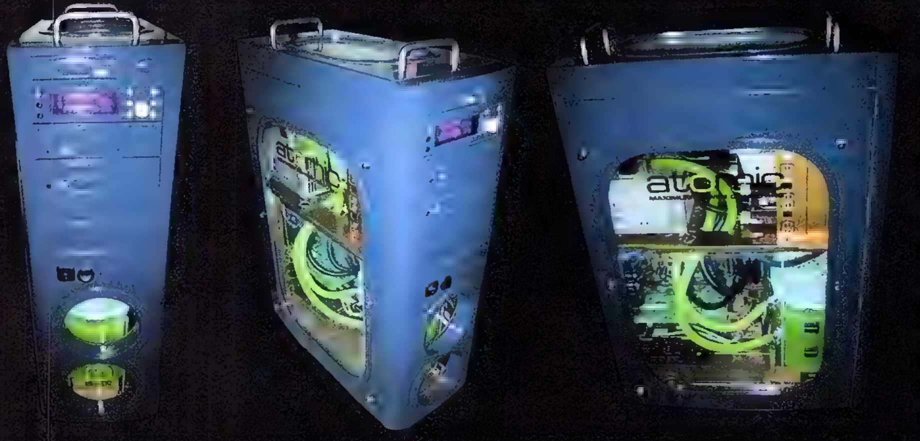
The story

Feeling bored one day and wandering past Aussie Disposals, the ammo cases on sale caught my eye. This would make one nasty mod, I thought . . . After a mental debate I went back and picked up the one with the least rust for $40 and started to plan the mod. Luckily, my motherboard fit perfectly inside, because anything much bigger wouldn't have done the job. Grabbing a standard ATX case from a swap meet I set upon my project and tore the thing apart.

Not knowing exactly how this was going to work I spent two days in the shed armed with a jigsaw, some drills and whatever was around, and emerged with this ammo case. After jamming the components in, the moment of truth came – it booted! That is, until I put the lid on. The thing powered down. PANIC! I was very careful when constructing it to isolate all parts; the connection was on one of the power connectors on the motherboard. After doing the old masking tape tango, this heavy metal box was born.

Proud of your Hot Box? Send us a pic and you could win a free six-month subscription to Atomic! hotbox@atomicmpc.com.au

Sabien's blue beast



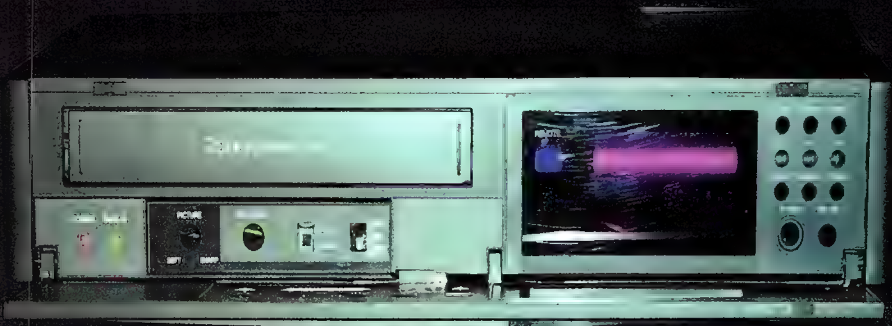
Technical details

- Athlon 1.4GHz at 1.63GHz
- ABIT KT7A motherboard
- 768MB Hyundai PC133
- Two IBM 40GB 5400rpm HDDs
- Leadtek WinFast GeForce2 Pro
- Pioneer 12x DVD-ROm drive
- Yamaha 32x/8x/4x CD-RW drive
- Sound Blaster Live! sound card
- Enermax 550W PSU
- Eheim 1048 Pump
- Black Ice copper radiator
- Cyclone copper water block
- 100% tupperware reservoir
- Five case fans at 5V each

The story

The AOpen HX08 case was bought purely for its ease of modding. The full side window and top case window to show off the goodies inside were put in first, along with the LAN handles on the top of the case. The chassis of the case was painted gold to contrast the navy-blue case. It sort of glows under the cold blue cathode tucked under the rim, halfway up the case. The front bezels are modified intakes made for a subwoofer. Wheels were finally added to the bottom of the case. The water-cooling system is the product of not wanting to listen to the whining delta and case fans for long periods of time. Now the loudest thing is the power supply fan. I made a wooden stand for the reservoir to cushion any vibration caused by the pump. The reservoir was made from a tupperware container with a healthy amount of sealant around the fittings to stop leaking. Custom brackets where made to screw the reservoir down and secure it to the case for travelling to lans. Finally, rounded cables complete my case mod.

Joe's power jukebox



Technical details

- Pentium III 733MHz
- Gigabyte i810 motherboard
- 256MB PC133 SDRAM
- Onboard i752 video
- Onboard AC '97 Sound
- Half-height SureCom 10/100MB/s LAN card
- Samsung 2GB boot drive
- No FDD or CD – all data via LAN
- Dynalink VGA TV encoder
- Samsung VCR case
- 100W microATX power supply
- Logitech RF mouse
- Purple neon lamp

The story

I wanted my jukebox to look totally unlike a PC. I came across a faulty Samsung VCR that looked ideal. After removing all circuit boards, wiring and tape mechanisms I was left with a shell which initially looked too small. After a lot of grinding away of hard plastic inside the box, things looked a bit more promising. Then I found a Gigabyte microATX motherboard that was quite tiny. Based on the i810 chipset it had onboard accelerated video and 32-bit sound. I had a spare PIII 733MHz CPU for it and fitted 256MB of RAM and a half-height 100MB/s LAN card. I used an old 2GB hard disk – big enough to hold Windows Me and the DivX decoders/players and MP3 players. All MP3s and DivX films come from a server connected to the jukebox via LAN. Controls are handled by an RF cordless mouse. Performance is exceptional; DivX -;)'s play smoothly via the LAN and MP3s sound great through the connected Dolby Digital system. To round it off I wired up an automotive purple neon lamp for a nice glow inside.

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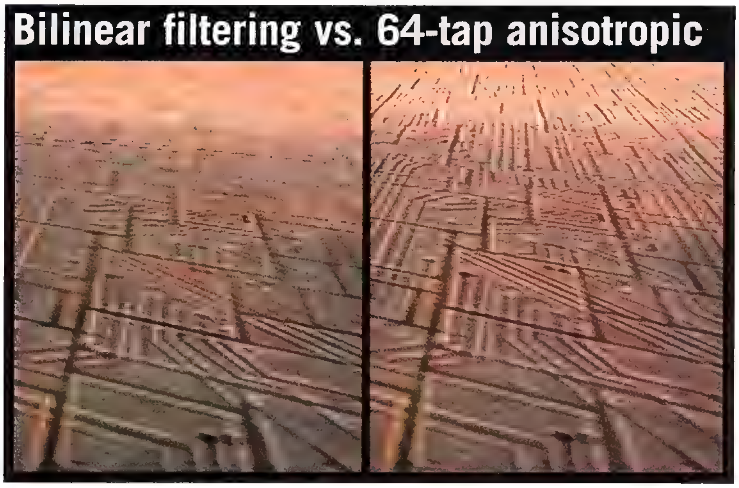
Texture filtering

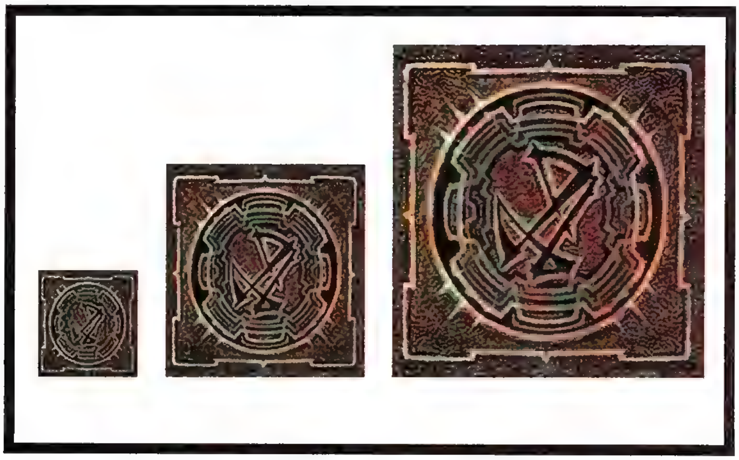
The anisotropic James Wang filters out one of the great graphics card mysteries.

Gamers are quite a rational bunch – that is, until you start talking about image quality. They'll have fist fights over 16-bit versus 32-bit colour and brawls over T&L, but they never mention a word on texture filtering. In most first person shooters, the difference between a poorly filtered image and a well-filtered one is much more staggering than switching to 32-bit colour or using T&L. So why do gamers bash each other to death when debating T&L, but scratch their heads when it comes to texture filtering? Well, as Homer Simpson would say: 'Ahh . . . the mysteries of life. '

There are numerous texture filtering guides on the Internet, but all seem to bombard the reader with technicalities rather than provide useful explanations of why textures actually need to be filtered. The underlying reason why we use texture filtering is because we need to display a 3D game world on a 2D display unit. Obviously, when we do this, a huge amount of data needs to be discarded or redefined.



ⓘ There is a very noticeable difference between the primitive bilinear and anisotropic filtering methods used by the latest 3D hardware.



ⓘ MIP mapping is not some obscure form of funk dancing, but a method of caching a single texture at multiple resolutions in order to make filtering more efficient.

For example, the face of a cube that is not facing us, obviously should not be displayed. This is done through the Z-buffer, which reads depth. Texture filtering, in the specific sense, decides which pixels, of all the pixels facing the screen, will be visible and how they should be displayed.

The texel: A pixel extremist

The concept of a 'texel' is one of the most misunderstood terms of 3D graphics. It is important to note that there is no fundamental difference between a texel and a pixel. Both are elementary units of display; a tiny square or circle of only one colour value. The word texel is derived from 'TEXture ELement'. In other words, any pixel from a 2D texture map is called a texel.

Our 3D world is basically made from wireframe polygons plastered by 2D texture maps. In the ideal 3D world where all walls are parallel to the screen and one texel from the wall texture corresponds to exactly one pixel on your monitor (100% zoom), each texel occupies the same position as the final pixel, the display is 100% accurate and no filtering is required. In reality, 99.9% of textures are not parallel to your screen, hence we are faced with the dilemma of choosing which texels are drawn and which are going to be dropped.

To make sense of this, imagine that you have a square array of 4 x 4 pixels. Let this be the equivalent of a texture used in the famous 3D engine of Quake. Now try to imagine that you can only see the world through a 1-pixel viewpoint, which is exactly how each pixel on your monitor feels. If that 4 x 4 texture is projected onto your monitor like guidelines on a highway, then you'll see a few texels at a time through the 1 x 1 gap.

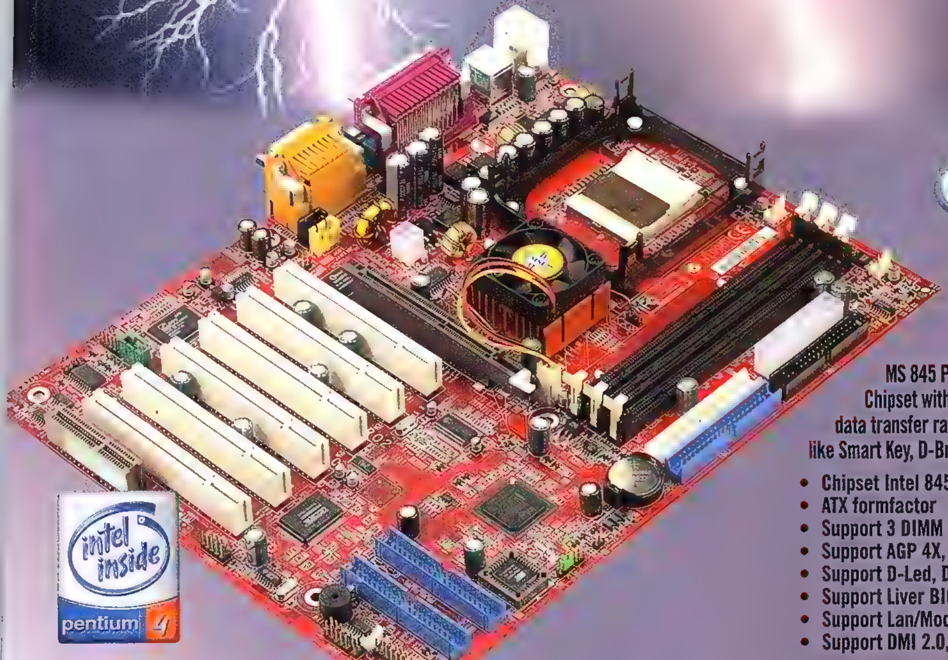
It's not too hard to imagine that by moving the texture to different angles, you will see a differing number of texels through the viewfinder. The dilemma is, if you can see four texels (3D world) but can only display one in the final output (2D screen), which one do you choose?

Texture filtering, then, is the art of selecting the right ones in the best configuration.

Tough twister: MIP map

MIP mapping is a method of reducing the amount of computation needed to accurately texture-map an image onto a polygon. Because we can move back and forth in 3D, the size of the textures will vary from our viewpoint. MIP mapping stores the same texture in different sizes, using the larger textures to tile the foreground and the smaller ones to tile the distance. The size of each succeeding texture is only half of its original dimensions and a quarter of the area.

By using the smaller textures for the background, ▷



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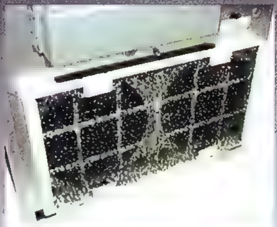
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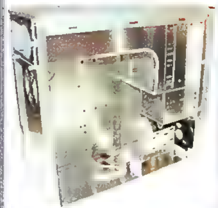
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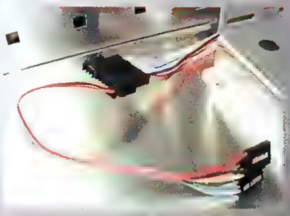
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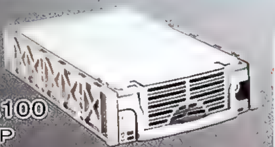
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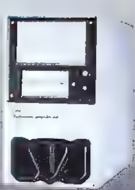
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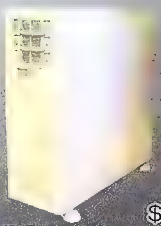
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> **'The reason why textures look blurrier at the end of a corridor is because bilinear filtering produces inaccurate results for textures that are not parallel to the screen.'**

each texel is larger, thus less filtering needs to be done. This technique reduces the texture shimmering that would occur if too many texels are crammed inside one small triangle.

Bilinear filtering: Blurry goodness since 1995

In our previous scenario of the four texels visible through a 1-pixel viewpoint, most people would suggest that we select all four texels and blend (or interpolate) them to form the final pixel. The interpolation is done on the four nearest texels from the pixel's centre and is a weighed average such that the closer the texel, the more it contributes. This is known as 'bilinear filtering' and is the most common form of filtering used today.

Bilinear filtering achieves two things: it makes textures look nice and blurry up close, and removes texture aliasing when viewed far away. Although bilinear filtering creates one of the most clear distinctions between software and hardware rendered images, it's not without its limitations. The reason why textures look blurrier at the end of a corridor is because bilinear filtering produces inaccurate results for textures that are not parallel to the screen. Another problem is that clear lines are visible between one MIP-map level and the next. This is due to the sudden drop in detail as the next MIP map is used for the receding textures. These MIP-map bands are clearly visible when you are running around in a first person shooter. It will take 'trilinear filtering' to smooth them.

Trilinear filtering

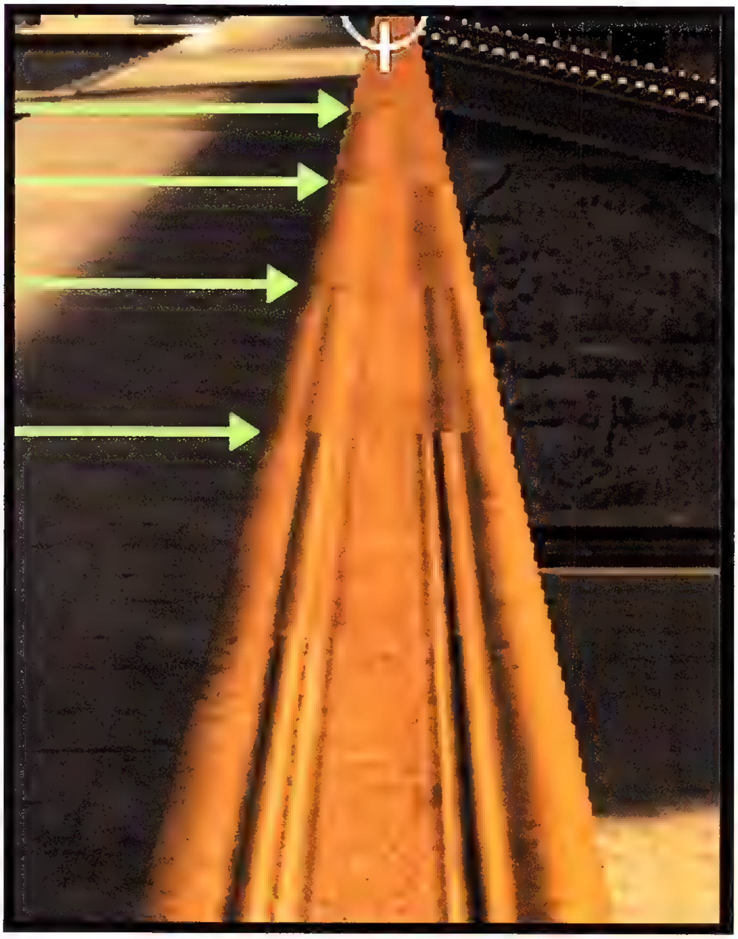
In order to remove the annoying MIP-map lines, we need a smooth transition between the two adjacent MIP-map levels. Trilinear filtering achieves this by bilinear-filtering adjacent MIP-map levels and then blending them together. The raw bandwidth requirement is doubled from 4x to 8x in this case since we access both MIP-map levels. Trilinear filtering paints a smoother picture but produces the same blurry textures in the distance. This is due to the isotropic nature of the filtering algorithm.

Anisotropic – yeah, I know him

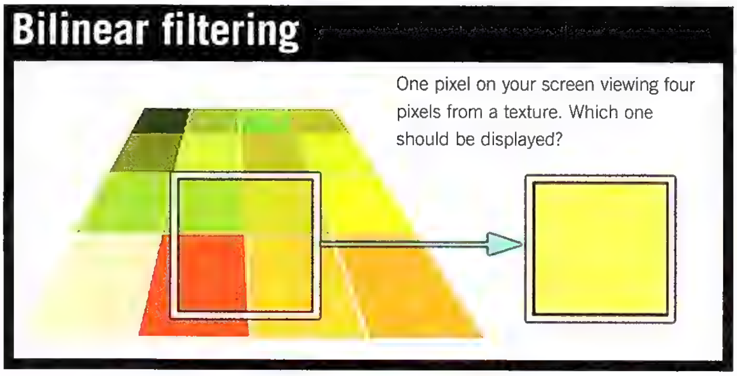
Broken down into its separate parts, the word anisotropic means 'not' (an) 'uniform' (iso) 'shape' (tropic). Instead of filtering texels using a square box, it uses a 'not uniform shape'. Both bilinear and trilinear are isotropic algorithms, as they only sample using a uniform square. The reason why isotropic filtering produces a garbled mess in the distance is because it takes too many samples vertically and not enough horizontally.

To alleviate this problem, we need filtering

▷

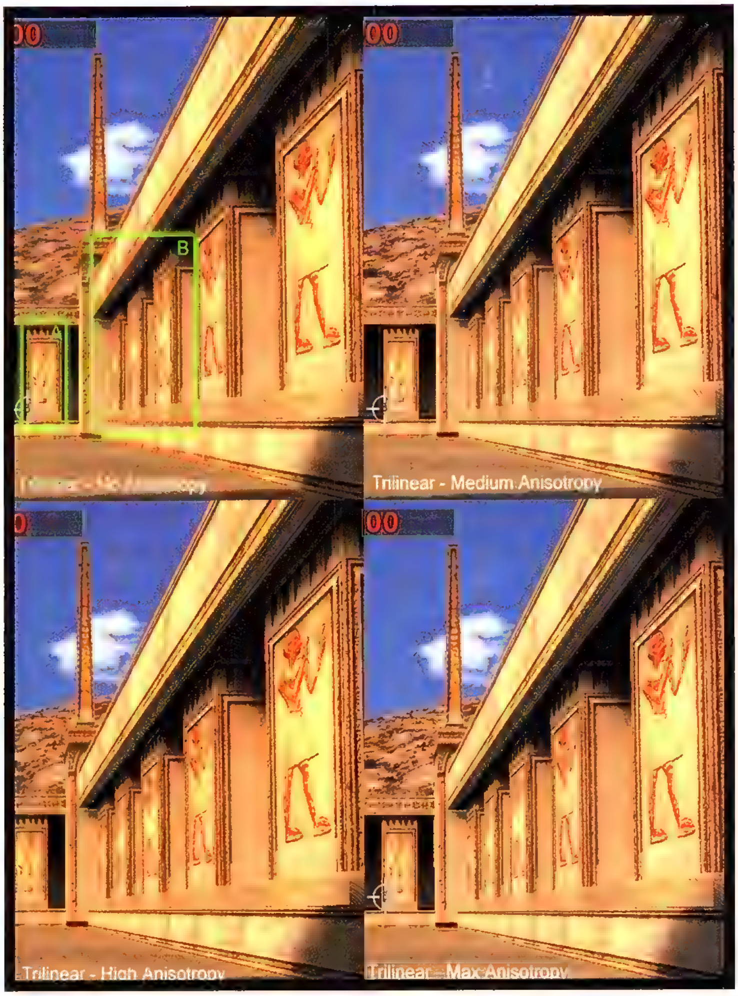


Bilinear filtering is responsible for the banding of textures that is a common sight in the corridors and crate storage areas of first person shooter games. The banding shows the jump between MIP-map levels and needs more advanced filtering methods to remove it.


Bilinear filtering
One pixel on your screen viewing four pixels from a texture. Which one should be displayed?

Bilinear filtering involves the blending of multiple pixels when a surface slopes away from the view. It averages out the colour values of the pixels and blends them into a single pixel for display.

> **‘Once you’ve found the sweet spots for Full Scene Anti-Aliasing (FSAA) with anisotropic filtering, there’s no going back to the blurry graphics of the past.**


B
A
Trilinear - No Anisotropy
Trilinear - Medium Anisotropy
Trilinear - High Anisotropy
Trilinear - Max Anisotropy

ⓘ Rather than using a square filter like other methods, anisotropic filters adapt to the angle of the polygon, making for much smoother filtering as anisotropy increases.

patterns that adapt to the polygon’s angle so that the right number of samples are taken from the right direction. Unlike bilinear filtering, there is no set way to do anisotropic filtering, and therefore different chips have different implementations.

All chips use the principle of taking multiple samples (8 to 64) through non-uniform shapes. The number of samples taken is known as the number of ‘taps’. So, for example, if 16 texels are taken for each pixel, then it’s known as a 16-tap filter. The number of samples taken is adaptive such that textures in the distance require more samples than the ones up close. This is only natural, as there is no way you can sample 16 texels when you are so close to the texture that one texel fills up the entire screen!

Anisotropic filtering will eventually replace trilinear filtering as hardware capabilities reach that level. Due to the high number of samples involved, all current chips require multiple clocks for anisotropic filtering. As a result, there is a significant performance slide with this filtering enabled.

To show just how tasty anisotropic filtering looks, we fired up everyone’s favourite – Serious Sam – and snapped screens at 1,024 x 768 using different levels of filtering. In the images at left you can see the result confirms that textures parallel to the screen are accurately represented by all filtering algorithms. On the other hand, look at how messy the image is when compared to the clean and crisp anisotropic shots. You may also have noticed that there’s not a lot of difference in terms of visual impact between the different levels (taps) of anisotropic filtering. In reality, the differences are more noticeable in-game.

Where do I smoke some of this stuff and what’s the fine?

Support for anisotropic filtering is through your video card’s drivers, as most games do not have a built-in option. The GeForce 256 supports a primitive 8-tap filter, which was increased to a much more usable 16 taps in the GeForce2.

The GeForce3 supports an awesome 64-tap, but, unfortunately, it is restricted by drivers to 32-tap and 8-tap in OpenGL and DirectX respectively. You can unlock this in the Windows Registry, but it’s much easier to use a utility called NVmax (www.nvmax.com) – a must-have for every GeForce card owner.

The performance hit from anisotropic filtering is purely a bandwidth one. For a GeForce3 at 1,024 x 768 x 32, it can bite up to 30% off your FPS (frames per second) counter and worsen as you bump up the resolution.

The Radeon supports 16-tap anisotropic, but it takes less of a performance hit when in use. This is most likely because it cannot perform anisotropic and trilinear filtering simultaneously. This means you either put up with MIP-map bands or bilinear-quality textures. The new models of Radeon cards (8500/7500) support up to 64-tap but they also suffer from this problem, which means it is likely to be inherent to the Radeon’s architecture.

The KYRO II supports 16-tap anisotropic filtering, but the performance hit is extremely savage, resulting in gameplay mostly below 30fps. Making the game look good is one thing, but if it means you’re going to be a sitting duck, it’s just not worth it.

Well, what are you waiting for? Get off your butt and start tweaking that video card you just paid the better part of a grand for!

Once you’ve found the sweet spots for Full Scene Anti-Aliasing (FSAA) with anisotropic filtering, there’s no going back to the blurry graphics of the past. FSAA removes those ugly, crawly edges, while high-quality texture filtering gives stunning field-of-depth detail. It is truly one of the great mysteries why these powerful features receive so little attention from gamers. After all, they actually work! ▢

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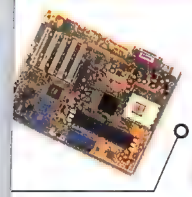

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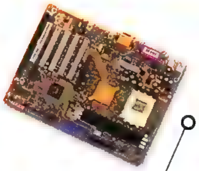

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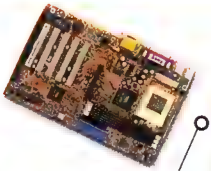

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SSE2 VS. 3DNOW!

James Wang stops floating pointlessly to give some singular instructions about multiple data.

Universal fact #101: You can improve a machine's performance in two ways: you can make it work harder or work smarter. The first way is known as brute force, while the second can be referred to as improved efficiency. SSE2 and 3DNow! are SIMD (Single Instruction Multiple Data) extensions designed for much smarter integer floating point calculations. Misinformed consumers (the majority) judge CPU power through raw gigahertz and buzzwords. We all remember the days when we could pay $1 to 'upgrade' to MMX. We all know where that went and how hot MMX is right now. The question is, how useful are these new instruction sets and is the performance increase tangible? Since the true purpose of SSE2 and 3DNow! is part of the bigger picture to improve floating point performance, we will first take a look at the importance of the floating point unit (FPU).

The search for extra floating point power

Traditionally, microprocessors were merely number crunchers. In the x86 architecture, the Arithmetic Logic Unit (ALU) processed all the raw data (integers) and floating point data was usually processed on a separate, dedicated math coprocessor. As multimedia and 3D gaming boomed, a powerful FPU became a must as these applications used more floating point operations. When the manufacturing process improved, the FPU was integrated 'on-die' with the ALU to form our modern day integer/floating point microprocessor.

Why is floating point important?

While it's nice that you can count, most numbers are not integers. Floating point numbers are used to represent numbers that are either too large or too small to be represented by binary integers. In this sense, floating point numbers can be understood as approximations of real numbers. For example, the number 4,538,123 can be expressed as 4,538,000. The result is, we gain storage but loose accuracy. It is more conventional to use an exponential form.

The use of floating point numbers is extremely intense in 3D graphics and multimedia. We all know that triangles are made from vertices and the transformation of vertices are an extremely intensive floating point operation. As the CPU still takes most of the burden when it comes to transform and lighting (T&L), a fast FPU is the key to blitzing 3D graphics. The battle is not really between SSE2 and 3DNow! as much as it is between the floating point calculating power of the competing CPUs.

Multiplier of cycle time for peak floating point speed (single precision)

CHIP	X87 FPU	SSE	3DNOW!
Pentium	1	0	0
Pentium II	1	0	0
Pentium III	1	2	0
Pentium 4	1	2	0
Athlon Classic	2	0	2
Athlon Thunderbird	2	0	2
Athlon Palomino	2	2*	2
Duron Morgan	2	2*	2

* SSE can not be used simultaneously with 3DNow!

FPU calculation

The x87 FPU contains three units: one for addition (FADD), one for multiplication (FMUL) and one for storage (FSTORE). The P6 architecture (Pentium Pro to Pentium 4) uses a single pipeline for the FADD and FMUL units while the Athlon features individual pipelines for both units. Performance-wise it means the Athlon can execute FADD and FMUL in one clock cycle while the P6 can process either FADD or FMUL but not both at once. This weakens the FPU of the Pentium 4 significantly when not using SSE2. The design philosophy for the Pentium 4 was to make up the weak FPU unit with a powerful SSE2 instruction set. When SSE2 is used, the effective bandwidth between the L1 and L2 cache doubles. While AMD need not have to count on 3DNow! for a powerful FPU, the Pentium 4 needs SSE2 support if it is to have the edge in floating point power.

Ultimately, there are five ways one can go about increasing floating point power:

- Raise the frequency of the FPU
- Pipeline the FPU
- Lower the latencies of the FPU
- A parallel pipelined FPU
- SIMD FPU

As you can see, SIMD is a very specific method and consequently requires dedicated software support. Any software using floating point operations can benefit from the first four methods, but to benefit from SIMD the developer must code specifically for the extensions. You may wonder what the big deal is with SIMD instructions if there are so many easier and more direct ways to improve floating point performance. SIMD may require dedicated coding, but if used efficiently, it can speed up floating point operations by up to 400%!

SIMD: how it works

A microprocessor's job is to turn raw data into useful information. In the simplest form it means performing a calculation on numbers and obtaining a result. To do this, a CPU fetches data and executes the appropriate algorithm to obtain the result. SIMD refers to using the same instruction to calculate multiple sets of data at once. Such a technique exploits data-level parallel processing. This will greatly benefit repetitive scenarios (performing the same operation on all data) such as inverting the colour of a photo, using the same algorithm to decode a stream of MP3, encoding DivX ;-), calculating 3D geometry, streaming video and many more. The number of streams of data that can be worked simultaneously corresponds to the multiplier effect when using SIMD.

Floating point performance is described in floating point operations per second (FLOPS), which is derived by a constant multiplied by the cycle time (MHz). The cycle time for the FPU is sychronised with the CPU speed. Hence a Pentium III 1GHz, without using its inbuilt SSE extensions, can achieve a theoretical 1 gigaflop. The multiplier effect, which is the significant benefit of using SIMD processing, is shown in the table on the opposite page.

SIMD evolution

Our first taste of SIMD came with the Pentium MMX processor. The concept behind the MMX (MultiMedia eXtensions) was sound, and the promotion was over the top. Unfortunately, MMX failed to proliferate because it only accelerated integer operations, not floating point numbers. AMD was the first to introduce a respectable floating point SIMD instruction set – AMD 3DNow! At the time, optimised tests showed that an AMD K6-2 300MHz was as fast as a Pentium II 400MHz in 3D. 3DNow! is a superset of MMX, which means it includes MMX instructions as part of its larger instruction set.

The next big step came in with Katmai New Instructions (KNI), later to be known as SSE, which was introduced in the Pentium III Katmai core. This was the first floating point-optimised SIMD instruction set from Intel and is currently in generous use. AMD updated its 3DNow! technology to 3DNow! Enhanced when they introduced the K7 Athlon. Witnessing the popularity of SSE with developers, 3DNow! Enhanced also included some SSE instructions, which, like MMX, is licensed from Intel.

With the introduction of the Willamette Pentium 4, Intel added a massive 144 new instructions to the original SSE standard. The SIMD integer instructions introduced with MMX technology have been extended from 64- to 128-bit registers. Double precision floating points (64-bit) are added and overall flexibility is greatly enhanced. The latest K7 chip, the Palomino-core Athlon, sports AMD's latest 3DNow! Professional SIMD instruction set. This new iteration offers the full original SSE instruction set as well as AMD's classic 3DNow! instructions.

SSE2 vs. 3DNow! Professional

Athlon 4's full support for SSE means the battle is really between 3DNow! and the 144 new instructions offered by SSE2. Although SSE2 is technically superior to the old 3DNow! instructions, they are more difficult to implement and are yet to be unexploited in games. On the other hand, 3DNow! instruction sets have had support since DirectX 6.0. Given the current rate of SSE2 support, it is fair to say that 3DNow! Professional is the most useful SIMD solution currently available; however, this may change if SSE2 eventually proliferates.

Since SSE is licensed from Intel, the core technology is largely the same (slight architectural changes). Both provide four-way, 128-bit SIMD single-precision floating point computation to the x86 ISA. This means SSE works on anything that fits into 16 bytes. This can be 16 separate bytes, eight words, four dwords and so on. Matrix-by-vector operations are easily accelerated using SSE, but most games use dot product-intensive operations. To do these operations using SSE requires 'major gymnastics', according to Tim Sweeney (lead programmer for Unreal Tournament). Most of the 144 new instructions are aimed at better memory and cache management. The time needed for developers to exploit this mind-boggling amount of extensions is anyone's guess. 3DNow! was (and still is) popular, because it is easy to implement – it was one of AMD's principle design decisions when setting out 3DNow! Intel needs to offer superior developer support if it is determined for SSE2 to succeed.

Performance

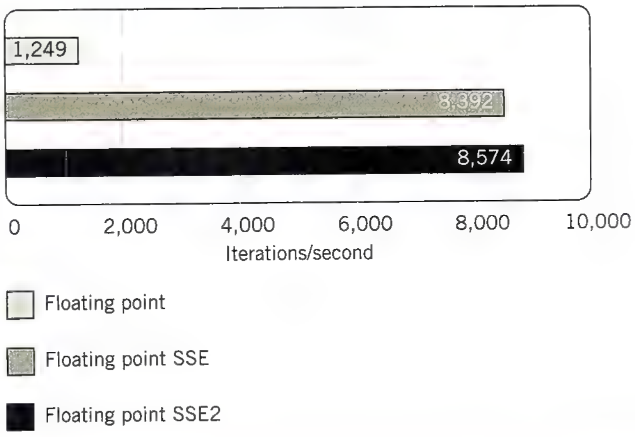
We run SiSoftware Sandra on a 1.8GHz Pentium 4 and 1.4GHz Athlon. The synthetic FPU performance increase with SSE2 enabled was nothing short of staggering, jumping from 983 megaflops to over 2,000. SiSoftware Sandra Multimedia benefited consistently from SSE1/2 and 3DNow! The floating point performance jumped over 600% with SSE enabled but, surprisingly, SSE2 scores did not show much improvement over SSE1. Integer performance linearly scaled higher as we switched from Software to SSE to SSE2.

3DMark2000 Pro's CPU marks were also boosted by the SIMD optimisations, giving the Athlon an 11% boost to 426 while skyrocketing the Pentium 4 by 73% to 426 3DMarks. To test real-world performance, we ran the 3DMark2000 high polygon test at 640 x 480 x 16 to stress the floating point and SIMD unit. The performance boost was significant, doubling in some cases.

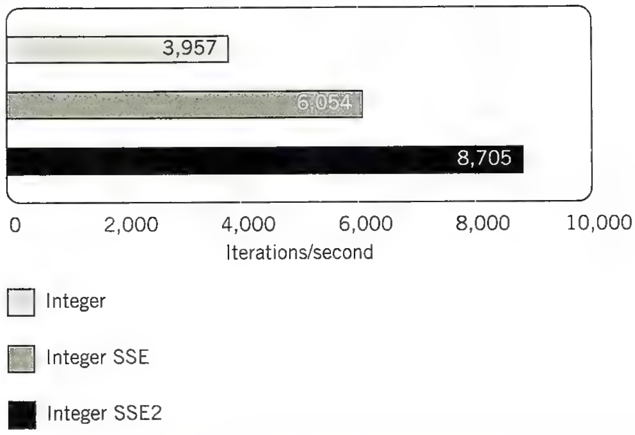
Game developers

Both Intel and AMD aggressively market the benefits that SIMD extensions will have on games. At one stage, 3DNow! was rather popular as a highly optimised Quake 2 patch that gave a dramatic improvement in frame rate, outpacing the Pentium II clock for clock. Fast forward to ▷

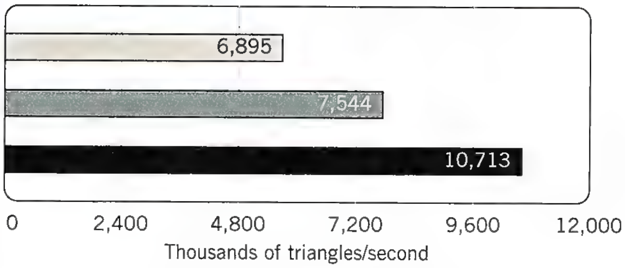
SiSoftware Sandra Multimedia: Floating point



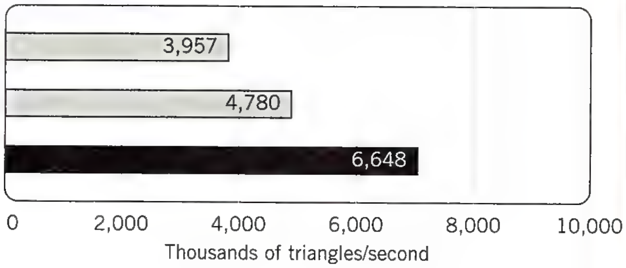
SiSoftware Sandra Multimedia: Integer



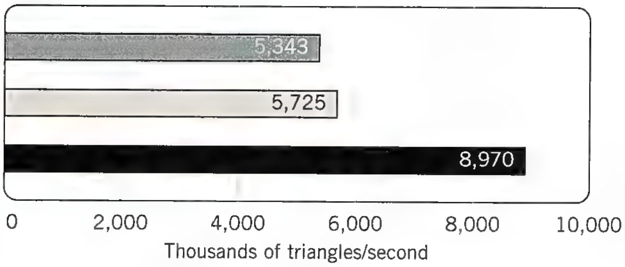
3DMark2000 Polygon Count: One light



3DMark2000 Polygon Count: Eight lights



3DMark2000 Polygon Count: Four lights



☐ Pentium 4 1.8GHz (SSE)

▨ Athlon 1.4GHz (Software)

■ Athlon 1.4GHz (3DNow!)

2001 and the response of developers to such technologies is rather lukewarm. Why? The reason is that previously, the floating point-intensive geometry operations for 3D games benefited greatly from an optimised FPU. The introduction of T&L on the GPU meant that these floating point-intensive operations can be done more efficiently on the graphics card, hence eroding the importance of a powerful FPU.

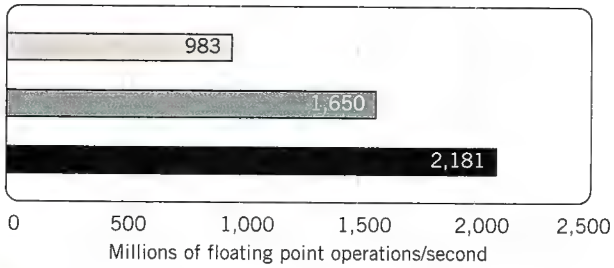
According to Dean Sekulic of Croteam, one of the key programmers behind everyone's favourite Serious Sam, FPU is not the bottleneck in the modern PC. Other developers agree, indicating that the computer's memory architecture is a bigger concern. This means that there's sufficient FPU power and bandwidth between L1 and L2 but the management and bandwidth of the main system is the real worry.

'The main problems with the PC are not related to too little hardware power, but rather really stupid things being done with the OS and various APIs,' said Jim Malmros from Insomnia Software (source: Voodoo Extreme at www.voodooextreme.com). Some developers are angry at Intel's lack of support when it comes to SSE. One objection is that Intel charges $US200 for its VTune software. VTune is essentially an optimisation tool for SSE and helps to find bottlenecks in the system. AMD offers a similar program for 3DNow! free of charge. SSE2's main benefit over the original is its support for double precision (64-bit) floating point numbers. This has very little use for current games as double precision results in no tangible benefit. Not counting 3DMark2001, no current games are optimised for SSE2. Developers have still not moved beyond contemplating support for SSE1/3DNow! SSE2 is much more useful for high-end scientific and engineering software that requires extremely high levels (64-bit) of FP accuracy. SSE1 is already supported by major office and workstations applications such as Adobe Photoshop and Premiere, and 3D Studio Max, and is mainly supported by games through DirectX 7.0/8.0.

While there is concrete evidence from our benchmarks showing improvement in floating point and integer operations, other claims made by the two companies are hardly true – claims such as 'ultimate Internet experience'? Excuse me, but unless SSE turns copper wire into optic cable, I think I'll pass for now. With the proliferation of T&L, SSE and 3DNow! are becoming less important to game developers than they were three years ago. AMD's adaptation of SSE in the Athlon 4 may signal that it will concentrate on Intel SIMD extensions rather than go proprietary. The importance of SSE2 support for the Pentium 4 can not be overemphasised. As the Pentium 4 suffers from a sub-par FPU unit, SSE2 is essential to competitive floating point power. While gamers can look toward the GPU for future enhancements in gaming, SSE2 will offer considerable benefit to MPEG-4 encoding with optimised encoders.

The overall direction seems to be that SSE1/2 is here to stay while the original 3DNow! is on the way out. We may see future iterations of SIMD extensions from AMD but it's just as likely it will jump on the SSE2 wagon, or perhaps introduce a combination of both. The good news is, SSE is now on tap for the Palomino-cored Athlon and Morgan-cored Duron, and can look forward to wider support in the future.

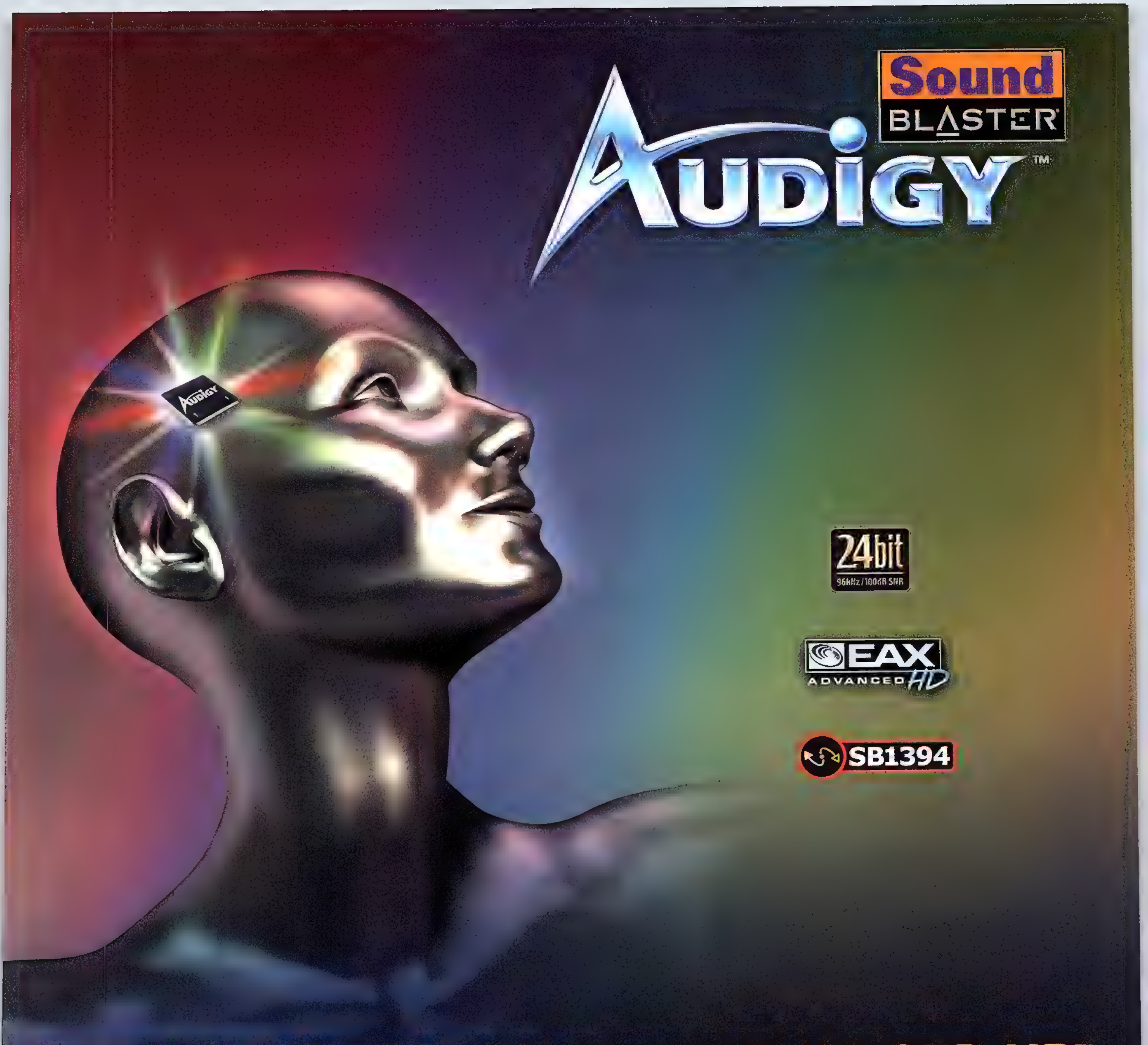
SiSoftware Sandra FPU Whetstone



☐ Pentium 4 1.8GHz

▨ Athlon 1.4GHz

■ Pentium 4 1.8GHz (SSE2)



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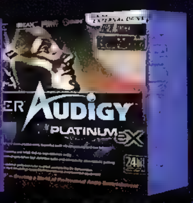

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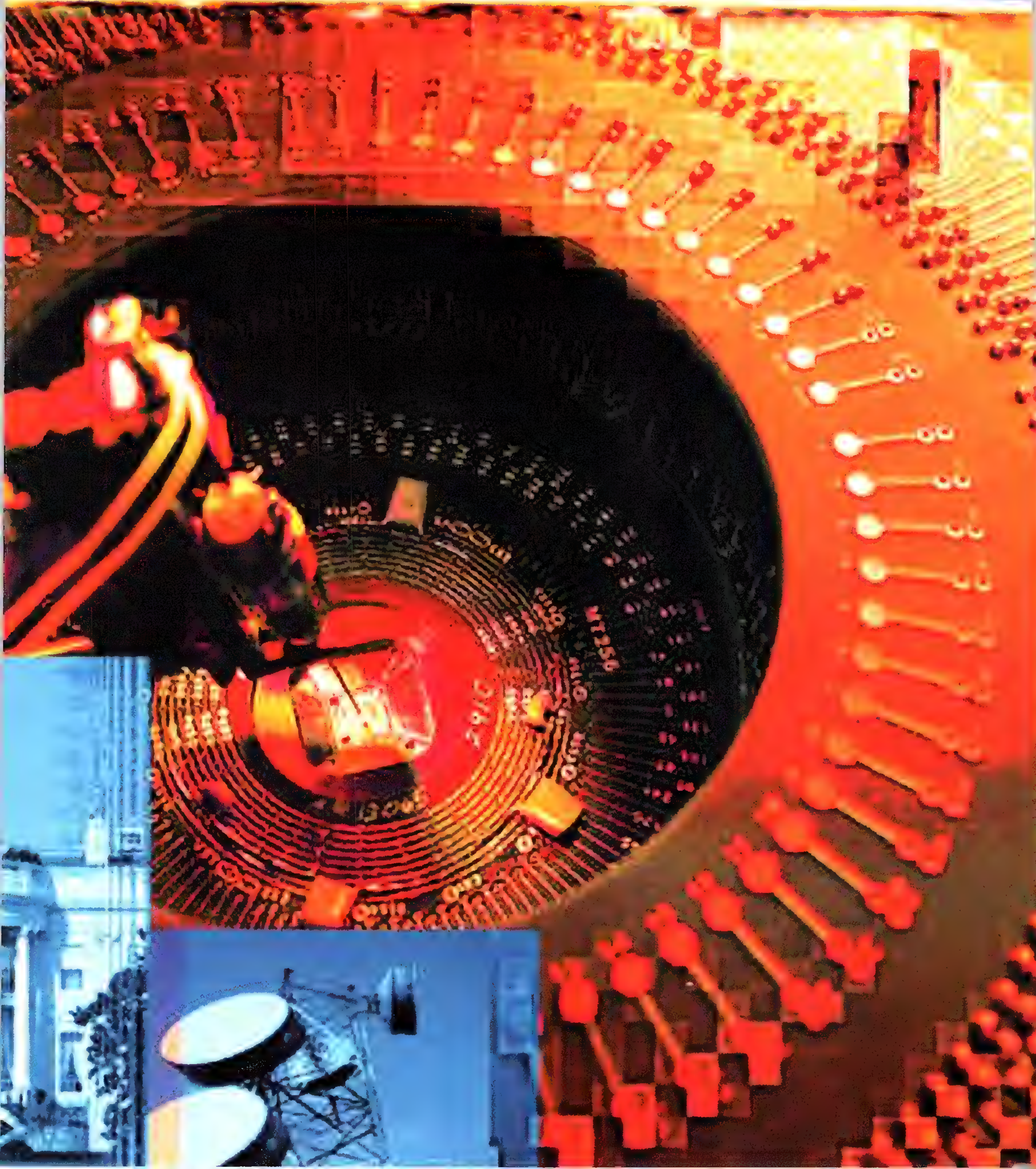

Paying to play

Murray Philbrick finds that no matter how hard he tries, it is becoming increasingly difficult to have some innocent fun online.

Back in 1996 or so, the Web was the next big thing. Fuelled by the success of a company that was making headlines worldwide – Amazon.com 'the world's largest bookstore' – big business wanted to jump on the bandwagon, and turned to the Web to tap into the kind of marketplace where you could run a business without having to worry about having unsold inventory. Buzzwords like 'eCommerce' were springing up all over the place, and even the smallest business plan or oddest, most bizarre site could show some initiative and wind up with literally millions of dollars thrown at them.

Of course, few people at the time seemed to take particular note of the fact that Amazon.com hadn't ever turned a profit.

Argh, pop-ups!

With all the money that was being thrown around so rampantly at the time, people were desperate to think up ways of cashing in on the millions of people who were taking their first few tentative steps into the online world. Advertising was the first thought, naturally, but the reality of the situation was that some sites weren't suited to any company's particular target audience, much less a specific product.

Despite this, Web sites began to charge incredibly large sums of money to display advertising banners and pop-ups on their sites. Sites with a large number of hits per day were getting away with charging mind-boggling sums of money per month for advertising that may or may not even show up on any given Web surf to that site's screen.

Rise of the networks

Before too long, several large Web networks began to appear and buy up smaller sites. The logic behind this was that in buying up a lot of smaller, quite popular sites and adding them to their networks, they could add their total number of users to the hits their entire network was getting and spread the advertising over all the sub-sites. 'We have 10 million hits per day over our entire network' certainly sounds a lot more impressive than 1 million . . . ten times as impressive in fact. So, naturally, you can charge ten times more for advertising fees. Right?

Everyone was happy at this point. Big business was happy because it was 'reaching' 10 million people a day in this bold new business frontier, networks were happy because they were making huge money from advertising revenue, and the small network affiliate sites were happy because they were being paid huge amounts of money for very little work. Some larger networks were paying even their smallest sites $US4,000 per month, plus a portion of any additional income brought in by their readers clicking on banner ads (sometimes around 20 cents per click, and in some reported cases as high as $1.20).

It was a good time to be 15 and a WWF fan with a copy of Dreamweaver that's for sure. Ctrl-C, Alt-Tab, Ctrl-V. Sure beats the ol' paper route.

Uh-oh . . .

Within the next year or two, though, things began to turn sour. Big business started to ask, hey, perhaps $100,000 for a tiny banner ad wasn't so good. That ad gets seen by one user out of every hundred, out of which another one out of every hundred actually clicked on the ad to find out more, from which another one out of every hundred actually bought something which was usually a $20 item because, hey, 'Who the hell trusts buying things over the Net?' It didn't exactly make good business sense.

So the rules changed a bit. From then on, big business would only pay for traffic that clicked through the banner ads to their Web sites, plus maybe a little extra. This concerned the networks a little, but everything was still fairly good.

They're onto us!

It wasn't long before the big companies and networks realised that they were getting a whole lot of clicks from the same IP addresses over and over again, and from around the same times. While it didn't exactly happen absolutely everywhere, it was a fairly standard practice for users to try and 'support' their favourite site by hammering away repeatedly at the first banner ad they happened to mouse over, all the while reading the latest Superfriends update on Seanbaby.com.

The introduction of a system whereby banner ad click-throughs were only paid for from separate IP addresses became common practice very quickly, and it's this particular piece of good business sense that's gradually brought about the demise of many high-profile sites and networks in the past year or two. With less cash flowing in, many high-traffic sites and networks were unable to foot the bill of the bandwidth they were using for their own sites, let alone pay their affiliates.

The collapse had begun.

What next?

Certain traditionally non-Web companies have been hit hard by a perhaps slightly overzealous leap into the wonderful world of eCommerce. Future Publishing, based in the UK, put forth both Daily

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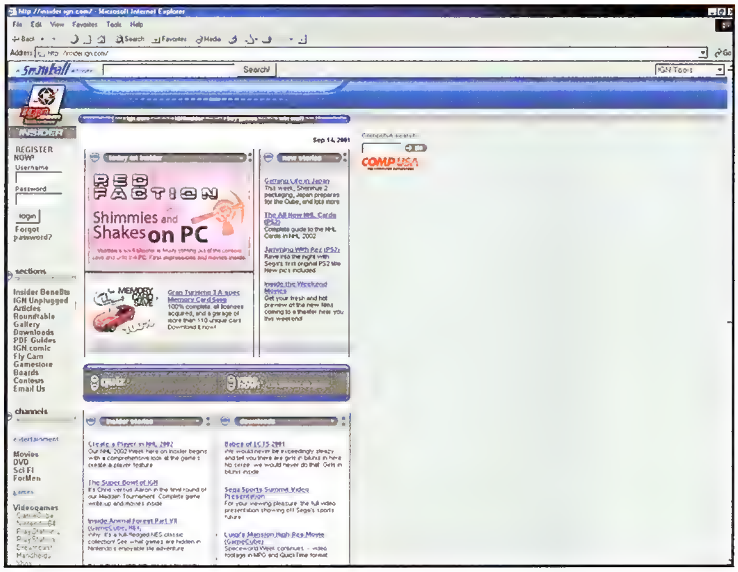
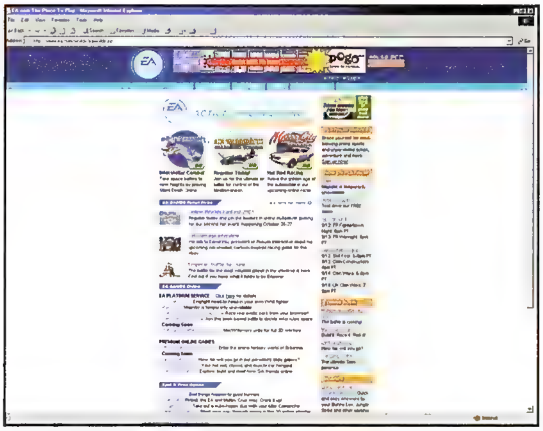




ⓘ EA.com has become more than your stereotypical games publisher's Web site. It is slowly beginning to offer pay-to-play games, the most significant of which are Majestic and the upcoming Need For Speed multiplayer title, Motor City Online.

ⓘ IGN is one of the games sites that has made major changes to survive in the current climate.

> 'EA.com was formed, at least in part, to help provide America Online with games that its users could download and play over the Web.'

Radar and (through its association with the Snowball Internet group) IGN.com, which many consider to be either odd or just downright poorly thought out, considering they are (or were in Daily Radar's case) sites that dealt with Future's bread and butter in the paper-based publishing world – the games industry.

Daily Radar itself became a victim of a 'lack of viability' several months ago, and rumours continue to bubble around the 'imminent' closure of IGN after it had to cancel many of its associations with affiliate sites around the same time. This isn't really news to anyone, as many large Web networks – UGO, the Ziff Davis network and several others – are having similar profit problems. Certainly, though, all the free-flowing corporate cash has dried up now, so companies that want to tap into the Net are beginning to look to other options.

Looking for a new model

One of the main problems to face big business when it comes to making a profit from the Web is simply that Web users expect all of their Web content to be free. This means an uphill struggle for sites such as IGN that are attempting to provide enough content to satisfy traditional Web users while simultaneously trying to gradually shift to a model where users have to pay for the information they read, as well as providing increased advertising for those who don't.

Launching a service called 'IGN insider' a month or three back, users pay a monthly fee to gain access to IGN's more exclusive news and member-only features such as 'IGN unplugged', which is a printable version of the site that can be carried around and read easily.

Of course, the problem that IGN faces is simply that much of the information available to subscription users (if not all of it) is most likely somewhere else on the Web, if not when first posted then at least within minutes of the first few subscribers reading about it in Insider. Whether or not this service actually begins to pay dividends as larger sites move to a similar model is still unknown, but for now it seems to be a shaky prospect at best.

On a different front from the gaming press, Electronic Arts has recently launched (or rather re-launched) its EA.com Web site as a pay-to-play gaming site. No doubt fuelled by the ongoing cash cow success of Ultima Online, EA has launched the service and are charging $US4.99 per month for access to its sports games, or $US9.99 a month for its Platinum services (more/different games, pretty much). EA.com was also formed, at least in part, to help provide America Online with games that its users could easily download and play over the Web. Essentially, the users 'rent' a games library on a monthly basis.

Unfortunately, EA.com also doesn't appear to be faring as well as first hoped by both EA and AOL. Though buoyed by a large influx of cash from AOL/Time-Warner to get it going, its relationship (and, therefore, presumably funding) was recently downgraded after AOL apparently became unhappy with the pace at which things with EA.com were proceeding. This is after Electronic Arts had purchased Pogo, a company renowned for its small and simple Web games, in order to meet its apparent 'games on launch' quota.

Federal Investigators search for evidence at the scene of
wreckage near
1995. It's been two years since
derailment
in which officials pointed to sabotage as the cause.
There have been no arrests in the incident.
MAH-0441

Majestic is one of the few games that has a truly unique approach to pay-to-play gaming.

> 'If these rumours are true, the HomeStation is intended to be a set-top box integrating a standard Windows OS and broadband with the ability to play both PC and Xbox console games . . .'

As if that apparent pull of support wasn't enough, though, at the time of writing it's just been announced that EA.com's flagship and very innovative product 'Majestic' – a game where players are phoned, emailed and faxed messages as if living inside a conspiracy theory – has been put on hold out of respect for the victims of the World Trade Centre attacks. Given that Majestic was, in a lot of ways, one of the few games that Platinum has thus far been able to offer with no real competition from the standard PC software market, and therefore perhaps one of the few true incentives to sign onto its Platinum services, it certainly won't help EA.com's already shaky launch.

Shifting the focus

Certainly one company that'll no doubt be paying very close attention to how EA.com fares over the coming months will be Microsoft, which has recently announced its intent to implement what they call their '.Net' initiative.

While the exact details of just what this entails is still hazy at best (even, it seems, among Microsoft folks themselves), the gist seems to be that MS is intending to change its role from provider of as-is software packages off-the-shelf to provider of 'software services'. Breaking this down further, its intent seems to be to move to a 'rent MS software over time' model, with users paying perhaps a monthly or yearly fee for, in essence, a temporary software licence.

While this sort of plan is certainly fairly far off, rumours are already beginning to circulate about Microsoft's next true step forward (or backward, depending on your opinion) – a product referred to by rumourmongers at this point as 'the HomeStation'. If these rumours are true, the HomeStation is intended to be a set-top box integrating a standard Windows OS and broadband adaptor along with the ability to play both PC and Xbox console games, and provide for such features as video on-demand, real-time TV pausing and other similar next-generation features.

The HomeStation would certainly seem to be the ideal means for Microsoft to begin bringing its .Net initiatives to the fore, though it also seems to be slightly askew from its 'a computer on every desktop' vision statement.

Still, though, it could be argued that a new business model probably requires new visions. Whether or not consumers are willing to stomach any of these new visions, though, is something that only time (and probably many more failed Web ventures) will tell.

Powerline broadband: viable or vapourware?

Murray Philbrick asks if there's new hope for broadband.

As the demands on Internet technology grow due to its now widespread acceptance, more and more people are looking to broadband solutions to do what they want to do even faster. Sure, most people's grandparents are able to fire off one or two 'This is Mavis, and I'm fishing off Guatemala' emails with no problems, but in most cases people's Net needs are becoming increasingly speed critical. Mavis might not even know what Service Pack 2 is, much less want to download it. But if she did, then chances are she'd baulk at the thought of having to wait an hour and a half for it to download via a standard modem.

In addition to downloading files many of us would consider the Net to be critical for keeping our systems tuned and purring; but Australia's slow rollout of broadband technology is leaving a gap between local Net users and our overseas counterparts. Game demos alone are getting to the point where a user downloading them over a standard 56K connection might have their phone line tied up for an entire day or two (even more if they're on 33.6K or less). And if we want streaming media to have a hope of resembling what it's actually supposed to be, broadband is a must.

Infrastructure in infancy

The primary problem with broadband rollouts in Australia is the lack of infrastructure in place to support them. Unfortunately, cable rollouts are expensive and time consuming, especially in a country with a land mass as large as Australia. This is why would-be broadband providers want to bypass as much of it as they possibly can, thus making their bottom line more attractive to investors.

Asymmetric Digital Subscriber Line (ADSL) and satellite are potential options to help work around this particular problem, but they are somewhat limited in terms of effectiveness and deployment. Satellite broadband is widespread, but its reliance on a standard phone line for data transmission (at a not-so-broadband speed of 33.6K) is its now almost legendary Achilles heel. ADSL, on the other hand, relies on old-fashioned copper telephone wires to support its transmission. To work it requires that there only be a short distance between a transmission point and the user. Some local ADSL providers quote a distance of 1.6km or less as their cut-off point, while others maintain it should be even less than that to avoid things going pear-shaped. Obviously, not every broadband consumer's house is going to meet every one of those requirements.

Assessing the options

While trying to come up with a cheap and viable alternative to the costly cable rollout process, networking giant Nortel decided to explore the potential of powerline-based telecommunications (PLT). In 1997, Nortel teamed up with United Utilities to form NOR.WEB, and the two companies began to investigate ways in which to transmit a high-speed digital signal over the already established infrastructure of power cables.

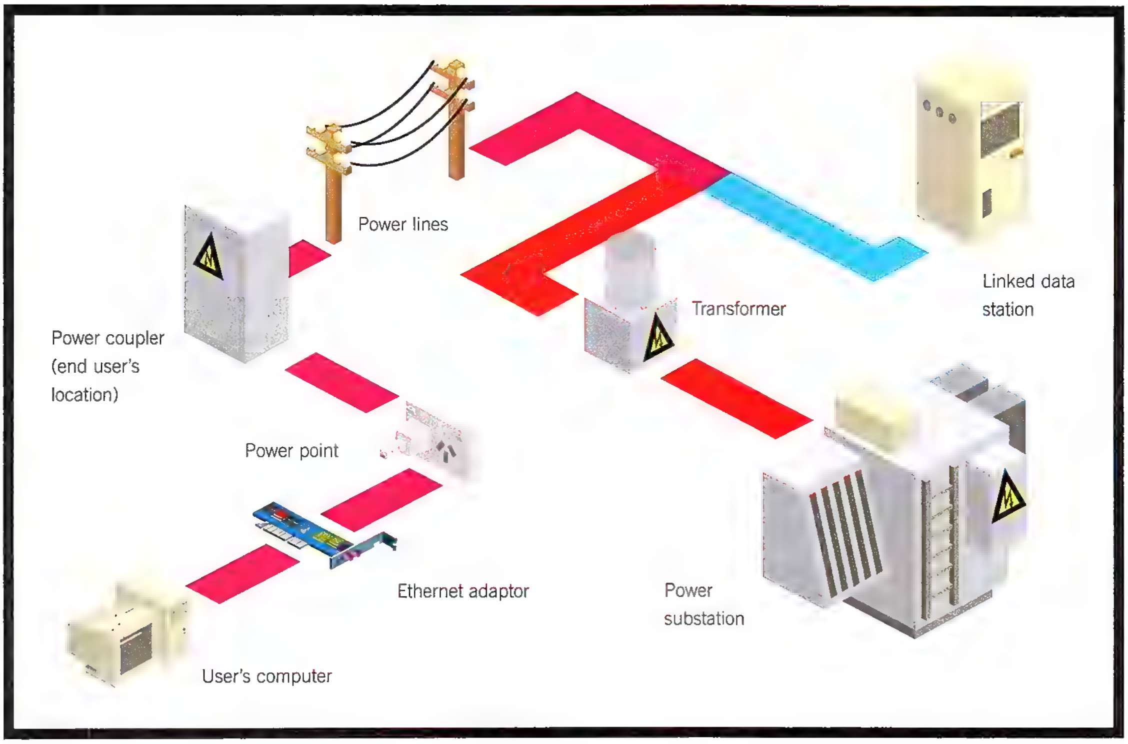
If they could successfully develop a solution that met high speed expectations, without the associated rollout costs, they would be able to enter the growing broadband market without all the associated problems and limitations of distribution or speed experienced with cable, satellite or the then-emerging ADSL broadband technologies.

Hurdles and pitfalls

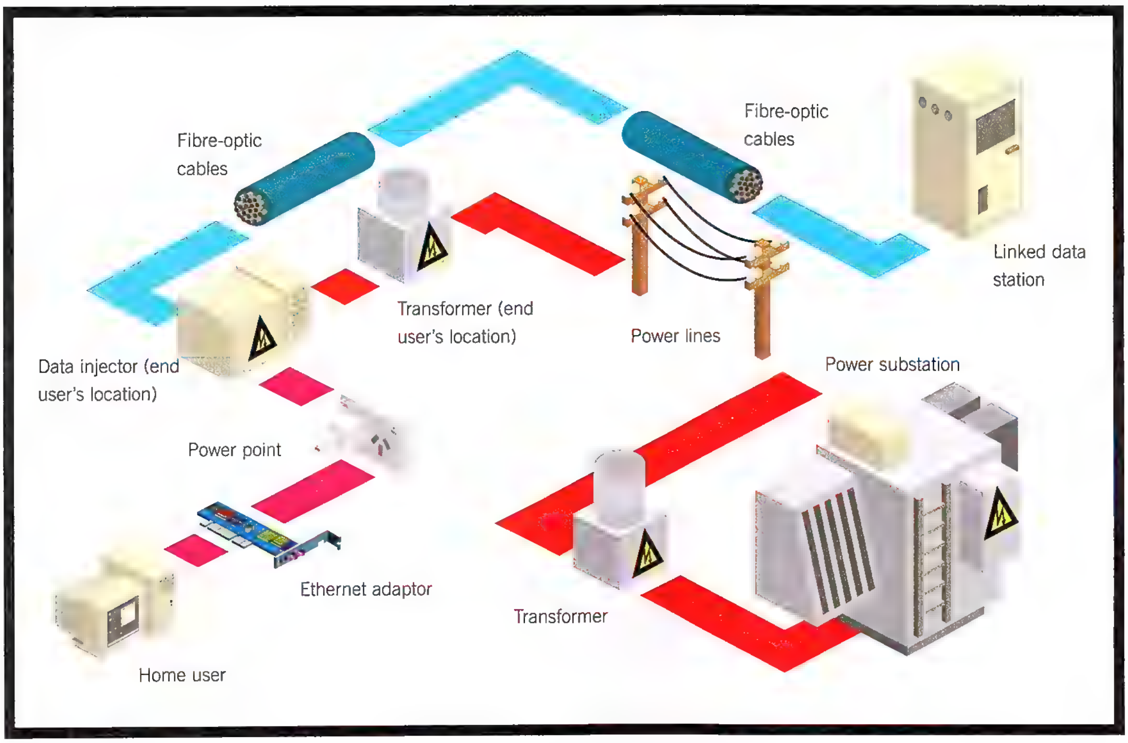
NOR.WEB looked to Manchester in England as the testing ground for its new technology. It soon became apparent, however, that many obstacles had to be overcome to try and create a digital signal over an existing power grid. Users involved in the testing of the networks reported problems such as local radio interference and unreliable speeds, though NOR.WEB adamantly denied that either of these problems were related to the network itself. The company then announced that it was hoping to commence widespread rollout of the technology by Christmas 1999.

In September 1999, NOR.WEB announced that it was pulling the plug on its operations. It cited several reasons for the decision, including the trouble it was having bringing the system in below the UK's radio frequency emission standards, the expense of installing coupling onsite at $US300 per household, and its comparatively low speeds to other broadband solutions: 1Mb/s compared to double that of cable and three to nine times slower than DSL (Digital Subscriber Line), for example. NOR.WEB was quick to point out that its system actually peaked at a more cable-like 2Mb/s, but overall it simply had to rule the whole project too expensive to continue in the face of three competitors emerging at once.

It wasn't long after this that a company called Media Fusion appeared amid a lot of fanfare. Its chairperson and systems 'inventor' claimed to be able to use standard power lines to pump data through to households at the whopping speed of 2.5Gb/s – and to have its technology dispersed and ready to roll out at low cost within a few months! All that stood



ⓘ The 'standard' PLT system, as used by NOR.WEB, relies on sending data packets at high frequencies over a regular power line. A power substation kitted out with a linked data-feeding station onsite pumps both the electrical current and a high-frequency data layer through the cables. These are then sent through to a power coupler at the user's location to avoid the line noise a transformer creates, before being sent through to a power outlet and onto the user.



ⓘ In the case of the current technology being adopted by various companies in Europe, the distance limitations of sending data as high-frequency signals is being overcome with the use of fibre-optic cables rather than power lines. While the distance over which the signal can be sent is greatly increased, latency times suffer due to more 'switching' points where the date is converted to a signal useable by fibre-optic, then by a power circuit and then finally by the Ethernet controller.

between the technology's rollout into the world was a final field test among a limited number of households. They signed a deal with a Californian utility company, and prepared for the big test . . .

Vapourware

But nothing happened. Not long before the tests were set to begin, Media Fusion fired its chairman and was then sold off to a New Jersey company for a little under $US300,000.

Apparently, none of the research into the technology had even begun, and the chairman himself had made off with millions in investment cash. As a result, many companies began to shy away from research into high-speed power cable connections, fearing that the entire idea would fade back into the realms of vapourware.

Recently there has been some renewed interest in the continued development of the technology. One company, German-based RWE, is even deploying the technology on a freely available commercial basis. Although its speed continues to peak at 2Mb/s (in the case of RWE's system, at least), it's still early days yet. However, more and more companies are beginning to invest R&D dollars into PLT.

The bad news is, the money is sorely needed if PLT stands a chance against the current frontrunners.

The existing technology that's in place is still running well below many people's initial expectations in regards to speed, and given how well established its competitors are, a huge speed advantage is potentially one of the only ways for PLT to create more demand.

There are several different methods for getting PLT to work, but all these methods have to walk something of a tight rope due to the transmission method, which, in turn, limits the effective speeds it can reach.

The ins and outs

PLT has one of the same problems as DSL: they both rely on lines that haven't been specifically purpose-built. This means that the lines both systems use carry an amount of noise that interferes with the digital signal required for data transmission.

In the case of DSL, the frequencies over which normal voice communication travels are fairly straightforward and predictable, with very few 'spikes' of noise outside its expected frequency ranges. You can therefore simply *cough* piggyback the data signal on a higher frequency, and it should arrive at the user's end fairly unscathed.

In the case of PLT, though, things are a little more complicated. The amount of line noise on any given power line can fluctuate wildly depending on the current passing through it at the time, which is determined by the number of happy home owners who are at the same time nuking a burrito, using their airconditioning system, or whatever else happy home owners tend to do. This, in turn, can lead to high-load situations that increase the frequency range erratically.

However, this can be bypassed by pumping the frequency of the data signal even higher, providing a decent buffer zone that avoids even potential interference from power lulls and surges.

The catch, of course, is that in increasing the signal's frequency it becomes more difficult to carry it over a distance. If you up the power to the signal to boost the range, though, you run the risk of violating various radio frequency emission standards and interfering with other devices.

In order to bypass this problem, RWE is using a different method. Normally, the signal would travel from a substation through the power line through a user-end coupler, to avoid the noise of a transformer, and then to the user's modem.

However, RWE is working to bypass the power line entirely by using a rented fibre-optic cable that piggybacks the power line in its place. The data signal is then reassembled and injected back into the power circuit between the user's transformer and their computer.

The up side of this method is that it allows for the data to be transmitted over a much longer distance, with a separate cable for both data and power. Of course, it also seems to miss out on a lot of the benefit that inherently comes with using an already established network, and it is completely reliant on having a network of fibre-optic cable already in place.

In addition, the use of fibre-optic cable means that end users have to put up with the same problems of shared bandwidth as standard cable users, and the two points of signal conversion (substation to cable, cable to power supply) noticeably increase latency.

In either case, there doesn't seem to be a viable high-speed solution that is widely available – yet.

Power-based LAN

While currently working, powerline-based broadband technology is still in its infancy. However, similar technology has already been used and marketed successfully to set up home power circuits as computer networks.

These systems transfer data over a power circuit in much the same way as broadband devices, with an Ethernet adaptor plugged into a standard power point (most serve the purpose of both a double adaptor and a data separator). Once the data is separated, it can then be transferred into a regular network adaptor in the user's system as via a standard LAN. Any system connected to the power circuit in the same way is able to log on to the same network (without it extending beyond the individual building's power circuit).

While the technology for using this system has been widely available for some time now, in most cases its main advantage is simply the convenience of not having to set up a large system of wiring. Unfortunately, the costs can still be quite high (some companies charge $US100 per node), while the speed itself is still around the 1Mb/s mark. Some companies, however, are now gearing up to launch systems that run at 14Mb/s. While this is a great improvement in speed, it is still not effective enough to truly bowl over standard cable-based LAN systems in terms of both convenience and performance.

The other issue with such systems is that when it comes to the LAN itself, large buildings that house multiple companies on the one power circuit can require LAN administration per building, rather than per individual company. This means that any company in the same building as another has theoretical access to their LAN via the power circuit. This is something that many companies would no doubt find a real concern.

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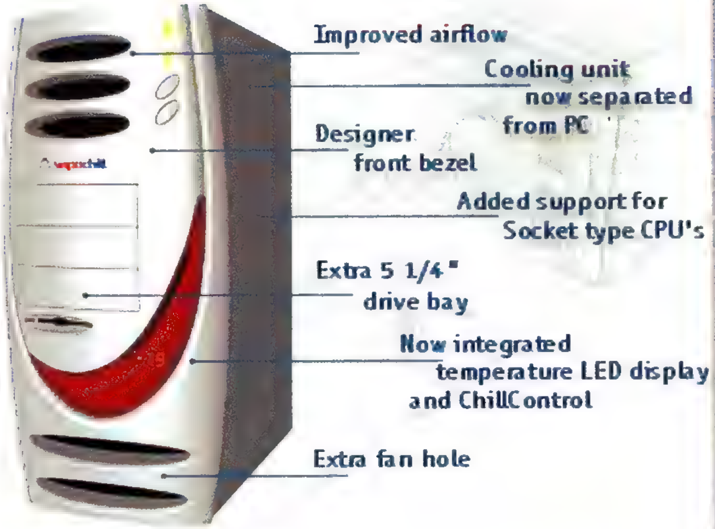
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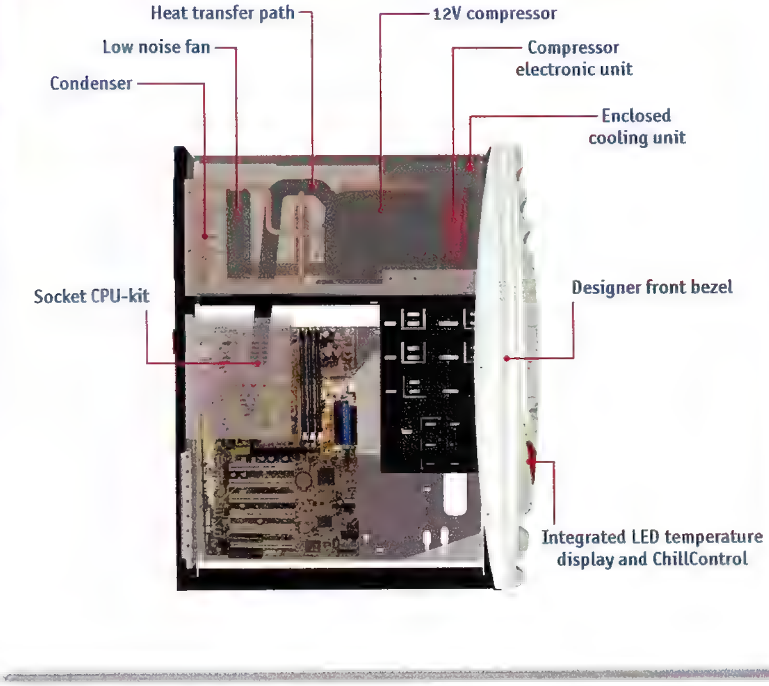


The looks or the lifestyle?

ollow ohn illooly's ew indows xperience.

The release of a new Microsoft OS has been a rather minor event for a while now. Apart from the much anticipated launch of Windows 2000 back in February 2000, new OS versions have been little more than minor tweaks, compatibility updates and the gradual disappearance of the once great DOS. Despite the minor changes, the ultimate underlying goal over the past few years has been the abolishment of DOS and the unification of the desktop and server streams of Windows onto a common kernel.

This goal has culminated in the development of Whistler. Based upon the start Microsoft made with Windows 2000, Whistler has since been donned Windows XP and represents a concerted effort to make the powerful (and stable) Windows 2000 kernel user friendly. Yup, XP stands for experience, and that is what Microsoft has tried to engineer. Whether or not you like the funky new bells and whistles, you would have to agree that in some way, shape or form, Windows XP will be one of the most important facets of computing in the next few years. The big question is, is it worth making the move to XP so early on?

Among certain circles it is thought that the release of Windows XP will kick start the stagnating hardware industry, with manufacturers already starting to ship certified 'XP ready' PCs. Component manufacturers are also leaping aboard the bandwagon. NVIDIA and AMD, two of the most prominent players in that industry, and household names among overclockers and gamers, have already touted the XP name with the recently released Detonator XP drivers and the 'sometime soon' Athlon XP. The move by NVIDIA is not surprising. By touting the XP name and tacking on decent performance gains it reassures everyone that it can be certain of good performance under XP when the time is ripe. AMD, on the other hand, is combating any moves by Intel to make some sort of spin on the Pentium 4 and the digital media focus of Windows XP, as well as making a long awaited push into the wider market by associating itself with a name that even every luddite on the planet will know.

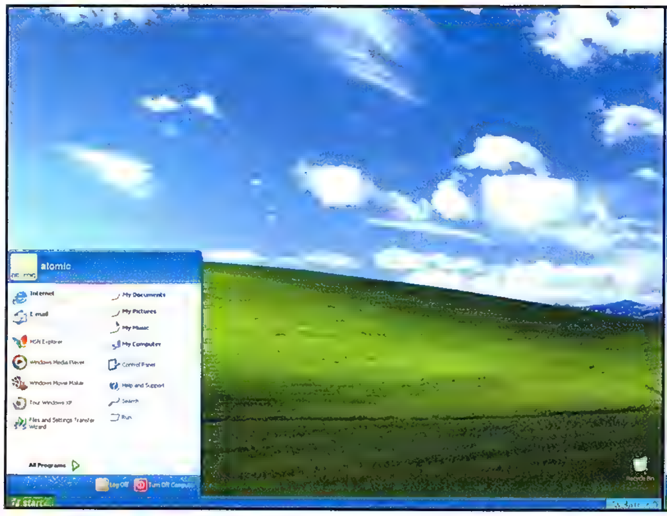
This, of course, is reliant on whether or not people will bother with Windows XP. Given the poor reception of last year's stopgap Windows Me, hopes were initially not that great. But after an enormous beta test and thriving warez scene with early versions, opinions started to swing. Apart from initial concerns such as the spooky Big Brother-like interpretations of the Windows Product Activation technology, some serious legal attacks by the US Department of Justice, allegedly intentional software compatibility issues and a one man crusade against the presence of raw TCP/IP sockets, the comments started to become positive. The rapid-fire release of RC1 and RC2, followed by a very early release to manufacture means that the final version will have been doing the rounds of hardware and software developers for at least a month before launch, which can only be a good thing for anyone who loves to sit on the bleeding edge of hardware. And for manufacturers who are relying on it.

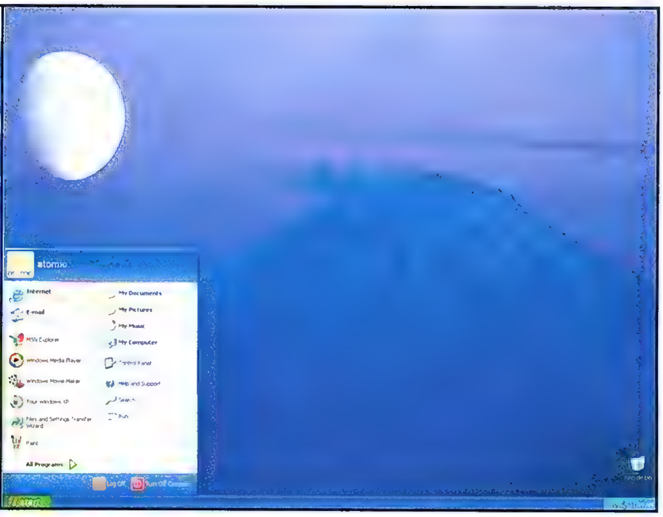
Gates, Ballmer and good looks – who would have thought it?

While Windows 2000 was mainly about stability and other back end issues, XP is all about interface. Just as Office 2000 was not focused on adding a pile of new features but rather on making it easy for 99% of the Office owning population to actually use the features that were already there, XP is about making it easy for people to get into what is a very deep OS.

This approach is well and good for people who use their computer only for email, or because they heard they could download music for free with one, but it means squat to users who are overly familiar with the nooks, crannies and foibles of every OS they have run.

The good news is that it is simple, though slightly time-consuming, to turn off a lot of the new features. Underneath the slick approach lies the same blue and grey we love or loathe. The dramatically reordered start bar can also be switched back to resemble the Start bar of old. But I'm skipping ahead of myself. As we all are aware, the first major step in the operating system journey is the much feared





installation.

Strapping it in

Windows XP comes on a bootable CD that features perhaps the most artistic holographic copy protection so far. Definitely a must see for anyone who is amused for hours on end by shiny silver objects. Unless you really want to dual-boot the system with a previous OS or one of those non-Microsoft open source operating systems, you are best advised to start with a nice, fresh partition for XP. Apart from this, forget what you know about installing Windows.

Rather than having to use the traditional 'remove everything but the drives, CPU, RAM, mobo and video card method', XP copes remarkably well with a fully laden system. As newer, flakier hardware hits the market this might start to change, but for now be daring. The actual install is very similar to that of Windows 2000, though thankfully made slightly simpler. The only partially confusing bit is the sudden option between NTFS or FAT32, but unless you are dual booting with an OS that only deals with FAT, NTFS is the way to go because it 1) delivers a boost in performance over FAT32 and 2) is an integral part of the security system used in Windows XP.

The rest of the routine is straightforward. The Network Detection Wizard does a great job of finding local networks, and even ADSL/cable connections and settings, with the minimum of fuss. In my network at home the shared connection through a Linux server was set up without a hitch.

A medium-length wait and a gig of hard drive space later, and XP is ready and raring to go.

Where's my My Computer?

The first thing that strikes you when XP first loads is the barren wasteland that is the new desktop. After years of being offered dodgy, cheap (and not so cheap) Web accounts with American ISPs, and being bombarded with links starting with 'My' and other general clutter, this is a big shock.

Rather than go immediately to the Start bar, the one thing anyone familiar with their OS will do is right click and head straight for the display preferences. Here you will find the way to roll back the look of XP to 2000 by switching your theme to Windows Classic. The ability to customise the Windows shell is far superior than anything that has come before, something borne out by the strong support by Microsoft for third party skinning programs like Stardock's WinBlinds, which has gone from cool underground tool to mainstream almost overnight.

The other properties haven't changed much, except for the inclusion of some more modern and stylish wallpapers and a beefed up advanced settings window. Flicking through this instantly points you towards the general level of modernisation that Microsoft has added to XP. Little touches, such as the OS being set at the highest possible refresh rate by default rather than the poorly defined 'Optimal' used in previous versions, all add to this illusion.

The other hidden gem in the Display Options menu lies under the Effects... button on the Appearance tab (shown in the bottom left-hand picture on this page). In this menu you can change the screen font filtering method to ClearType, which essentially anti-aliases the screen fonts to eliminate jaggies. The difference when ClearType is turned on is stunning to say the least. The enabling of this technology makes perhaps the most noticeable change to day-to-day tasks, and reduces the eye strain that comes after long sessions of staring at jagged type onscreen.

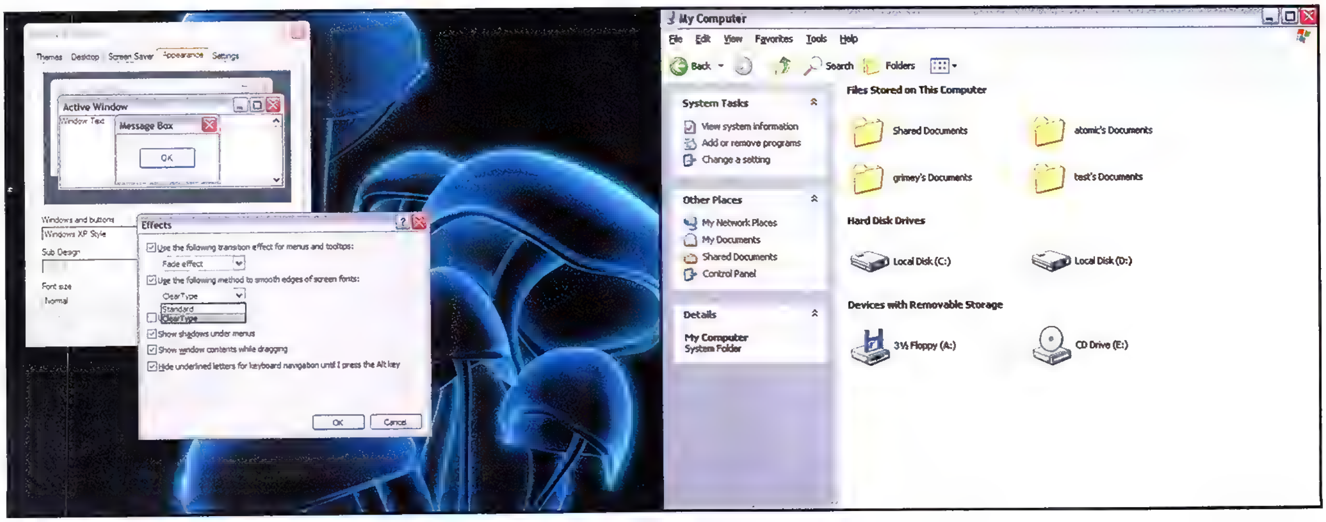
Like the old Start button, but ugly and green

The new improved Start menu takes the clutter from your desktop and crams it into a small box in the bottom left hand corner of the screen. I still haven't made up my mind about this new Start bar, but the little customisable logo in the top left corner is a nice touch.

The menu operates in a similar way to the 'personalised menus' that plagued Windows Me and previous versions of Office, collating a list of the most recently used programs on the menu. In addition to that dynamic list there are some permanent members, which can be added to by dragging and dropping. At the base of this lies the traditional Start menu style list of programs.

Oops!

By now the realisation sets in that, because XP hit the ground running in high resolution, with sound and your drives working properly, you forgot all about drivers. It is understandable, because Windows XP comes with incredible driver support. Forget the days of your KT133A motherboard not being detected by Windows, XP includes support for a range of non-Intel chipset makers including AMD, VIA, ALI and SIS, as well as a good base of support for all other components. Of course, Microsoft drivers are nearly always developed for stability, not bleeding-edge performance. So updates are definitely in order, and in the case of NVIDIA's Detonator XP drivers, worth the performance boost.



Effects

☑ Use the following transition effect for menus and tooltips:
Fade effect

☑ Use the following method to smooth edges of screen fonts:
ClearType

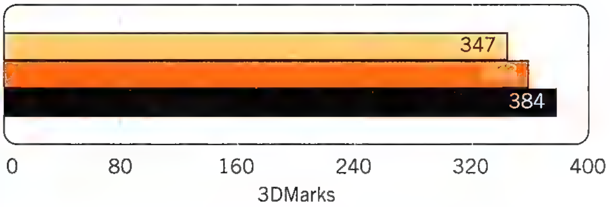
☑ Show shadows under menus

☑ Show window contents while dragging

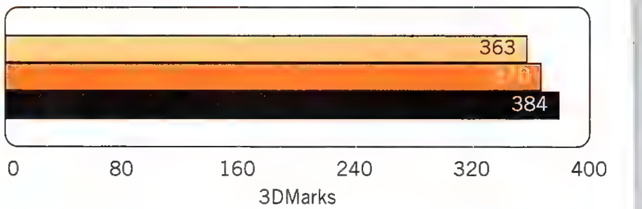
☑ Hide underlined letters for keyboard navigation until I press the Alt key

Celeron 300A – 3DMark2001 Pro

1,024 x 768

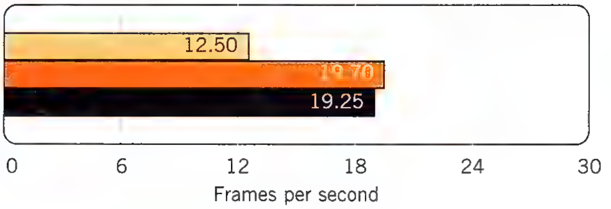


800 x 600



Celeron 300A – Quake 3: Arena

1,024 x 768 max.



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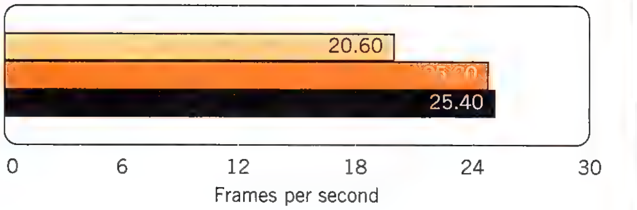

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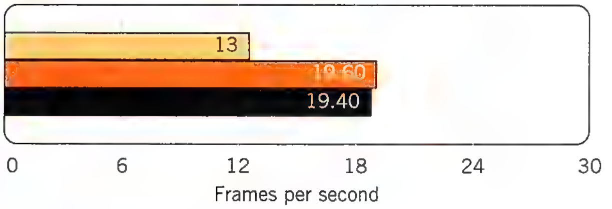

☐ Windows XP

🟧 Windows 2000

■ Windows Me

Features

Perhaps buoyed by the stay of execution handed down by the US Department of Justice, Microsoft has added a whole pile of functionality, which is handy but must be pissing off a lot of software development houses.

That said, a lot of these features have been sorely missed at the OS level for a long while now. The native support for Zip files that was part of Windows Me but hardly used is back, and this time it comes as a default option. Take that WinZip.

The new feature is the belated recognition that CD burners are becoming more and more commonplace. XP utilises an image-based burning process, masquerading as a packet writing one. Files can be dragged and dropped onto a blank CD in a burner; however, they are only burned to the CD when you right click on the drive and tell it to start burning. Windows Media Player 8.0 can also take advantage of this functionality and burn MP3 and WMA files to normal audio CDs. This functionality is good, but it is still not going to concern companies like Ahead or Roxio (which licensed a cut down version of its technology to Microsoft for this) just yet.

Windows Media Player finally supports DVD. Sort of. In something that appears to be a way of avoiding the licensing fees needed for inbuilt DVD support, the player leverages any codecs installed by other DVD software. Similar functionality has existed in Windows Me and Windows 2000, but it was hidden away (try going to 'Run...' and typing 'dvdplay'). This, too, is not as powerful as just running the third-party DVD player software in the first place.

Also impressive is the Files and Settings Transfer Wizard, which automates some of the annoying tasks of backing up files and settings (strangely enough), and actually appears to work well. The depth and potential ability to customise behind this means it is something that will receive many long hard examinations over the coming months. The only downside is the large files created when the wizard decides that it wants to back up your extensive MP3 and prOn collections.

There are a huge number of other features, too, both hidden and out in the open.

But Win2K is so goddamn slow!

The thing we all want to know is if XP is any good. In order to solve this quandary, we ran four test systems through the torture test of benchmarks under Windows Me, Windows 2000 Professional and Windows XP Home Edition. Taking a leaf from Microsoft's 'recommended' specifications we have dusted off the venerable Celeron 300A, plugged it into an Intel SE440BX-2 motherboard with 128MB of PC100 SDRAM and strapped in a once great Matrox G400 MAX video card. It was one of the leading-edge performers for its time and represents the sort of video hardware used in older machines.

The next test system consisted of a Pentium III 1GHz with 128MB of PC133 SDRAM on an ASUS CUSL2-C motherboard powering a 64MB Hercules ▷

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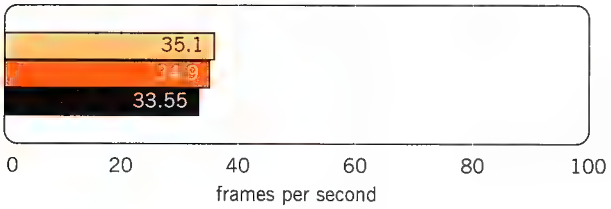
Pentium III 1GHz – Quake 3: Arena

1,280 x 1,024 max.



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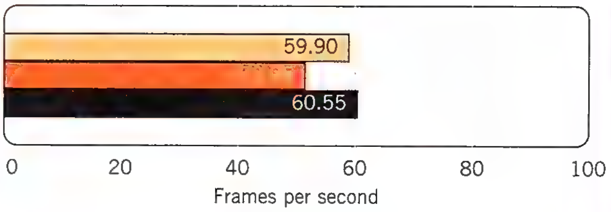

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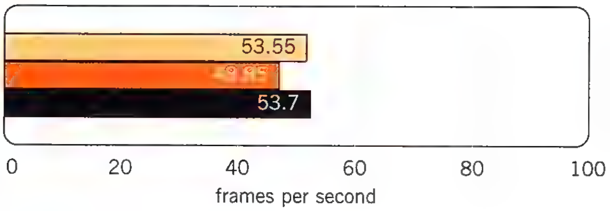

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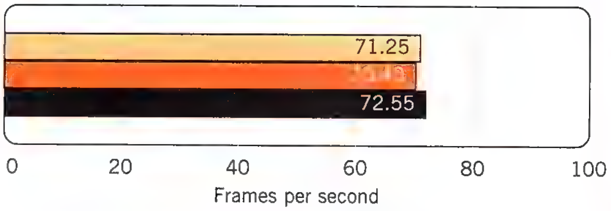
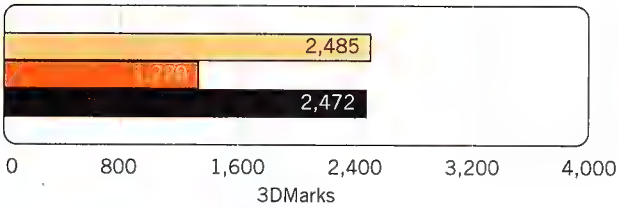


Pentium III 1GHz – 3DMark2001 Pro

1,280 x 1,024



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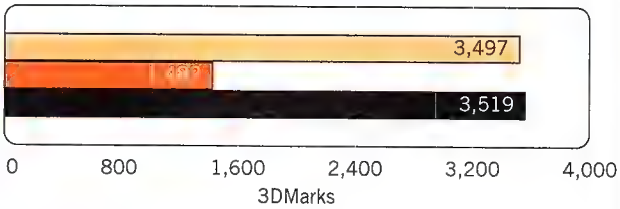

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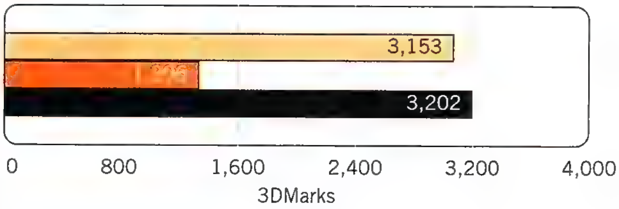


🟨 Windows XP
🟧 Windows 2000
■ Windows Me

GeForce2 GTS card. Alongside this was the big brother 1.8GHz Pentium 4 system using an ABIT TH7-RAID motherboard with 256MB of PC800 RDRAM and a 64MB Hercules GeForce2 GTS.

The final system is a typical cutting-edge gaming box, with a 1.4GHz Athlon chip, an ASUS A7M266 motherboard, 256MB of Odin 300MHz CAS 2 DDR SDRAM and a 3DPower Morpheus GeForce3.

We ran a series of benchmarks for each of the operating systems, and focused mainly on 3DMark2001 for DirectX 8.0 compatibility, and Quake 3: Arena for CPU and OpenGL performance. It was somewhat worrying to find that the current patched version of SYSmark2001 refuses to work under Windows XP – this is most likely due to the high level of system integration involved in the benchmark.

The 3DMark2001 tests were run using default settings (using Software T&L for the G400 and Pure Hardware T&L for the Morpheus) at 800 x 600, 1,024 x 768 and 1,280 x 1,024. Quake 3: Arena was run at 320 x 240 with everything except geometry and sound turned down for CPU tests, and with maximum settings at 800 x 600, 1,024 x 768 and 1,280 x 1,024. It is important to remember that because of the different hardware setups, the results are not directly comparable between systems, only OSes.

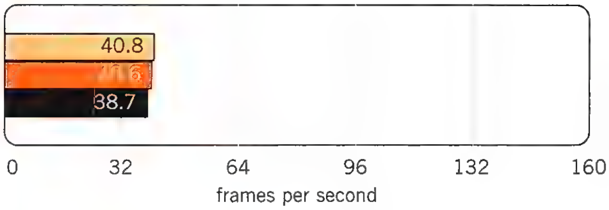
Fare thee well, fair Celeron

The only way to describe the performance of the Celeron system under all the benchmarks is sucky. Despite the overclockability of the CPU, it performed badly under every system we tested and only goes to prove what Microsoft told us about the recommended requirements, and that is, the OS will run but that's about it.

What the benchmarks do show is that performance does drop under XP, despite decent Windows 2000 results. This is a trend that is not borne out by the other systems we tested. It is this

P4 1.8GHz - Quake 3: Arena

1,280 x 1,024 max.



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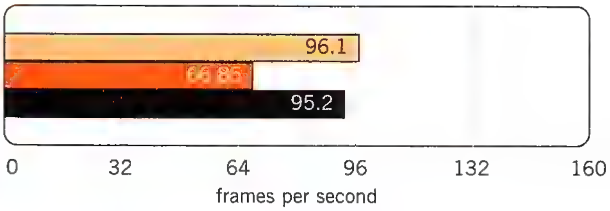

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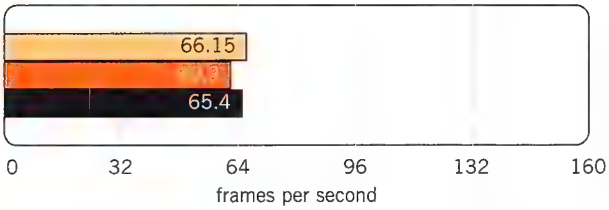

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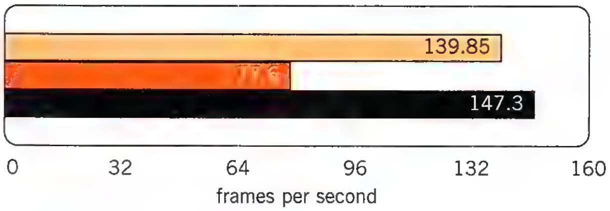
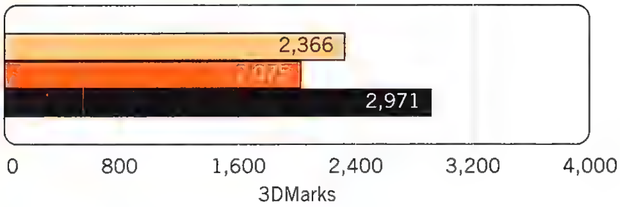
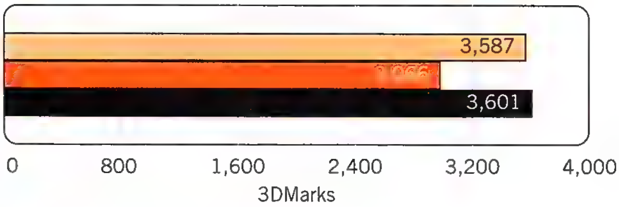


P4 1.8GHz - Quake 3: Arena

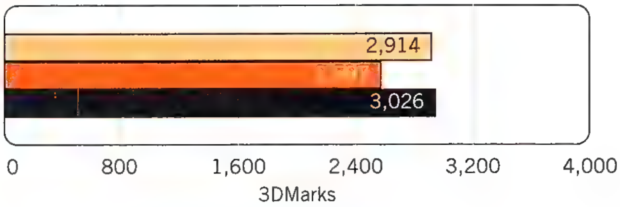
1,280 x 1,024



800 x 600



1,024 x 768



🟧 Windows XP
🟥 Windows 2000
⬛ Windows Me

ultra-slow performance that will lead to the touted resurgence in the hardware industry as anyone who upgrades from Windows 95 will need to go on a shopping spree to get their computer running at a decent speed again.

The mainstream solution

The 1GHz Pentium III system clearly demonstrated the poor performance under Windows 2000 that people keep mentioning. Even though the difference in the OpenGL-based Quake 3: Arena is small, under DirectX 8.0 the hit is much more pronounced. It must be noted that for these tests we did not use the newer Detonator XP drivers, purely because of incompatibility issues with 3DMark2001 under Windows 2000. The good news is that the sluggish performance seen when running Windows 2000 is wiped away by XP, bringing it back to Windows Me levels of performance.

This is significant, largely because the main things that have held people back from upgrading to Windows 2000 is poor game performance and some incompatibility issues with older games.

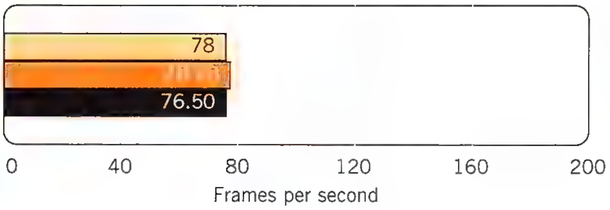
The big Intel brother

The performance disparity shown in the Pentium 4 system results is even more shocking, especially for Windows 2000 users. Even though the SSE2-enhanced 3DMark2001 Pro results show a much smaller disparity than the Pentium III system, the gap is also seen with Quake 3: Arena. Luckily, the XP performance levels are around those seen by WindowsME.

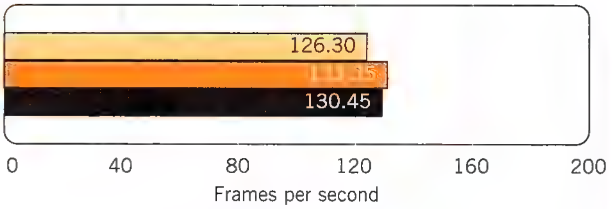
The Pentium 4 stands the most to gain by the digital media focus of Windows XP, and with the new batch of programs that will be developed to run under it, Intel must be counting on the inclusion of SSE2 optimisations as companies use Microsoft's new compilers in these new software versions. It is therefore quite feasible that the Pentium 4 will continue to gain ground as these programs are released. ▷

Athlon 1.4GHz – Quake 3: Arena

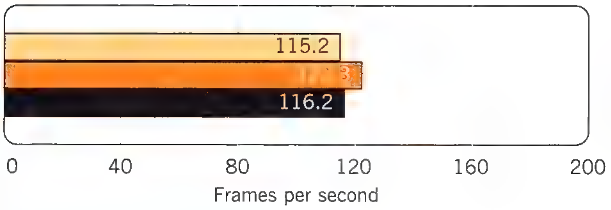
1,280 x 1,024 max.



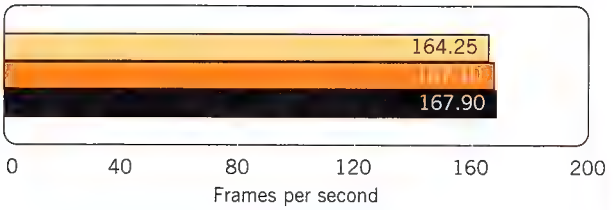
800 x 600 max.



1,024 x 768 max.

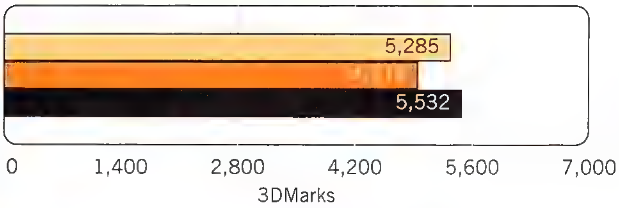


CPU

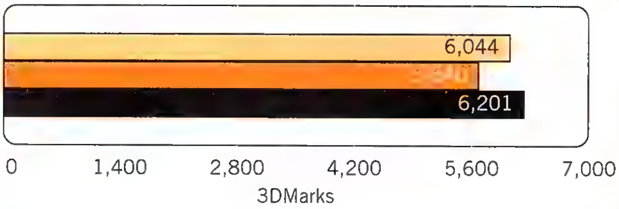


Athlon 1.4GHz – 3DMark20001 Pro

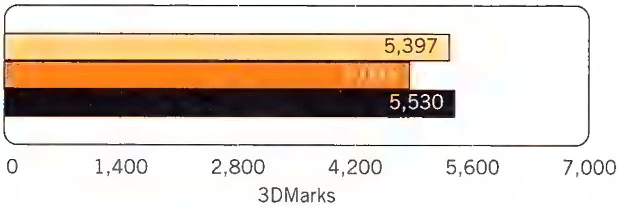
1,280 x 1,024



800 x 600



1,024 x 768



🟨 Windows XP
🟧 Windows 2000
⬛ Windows Me

Good for gaming

The Athlon system shows a very different picture to the Intel ones. The DirectX 8.0 performance gap in Windows 2000 is still there; however, it is much less pronounced than in the other test systems. Under OpenGL, the system shows some of its best performance under Windows 2000.

The gap between XP and Me is almost negligible. As a final test of this system we compared the leaked 14.70 Detonator drivers that we were using with the new Detonator XPs from NVIDIA. This shows an astounding leap in performance, in the order of 35% at 1,280 x 1,024 in Quake 3 and 20% in 3DMark2001 at 1,024 x 768. These drivers are somewhat buggy under Windows 2000, but so far appear to be rock solid under XP.

Is it really that good?

The results are overwhelmingly positive in favour of Windows XP. Even though most systems show a tiny drop in performance when compared to Windows Me, the added stability and functionality of the 2000 Kernel means that XP is definitely worth a close look for power users.

Windows XP seems to be the first new version of Windows in a long while that delivers. No longer do users have to resort to compromises between Windows 9x or Windows 2000; Microsoft has now delivered a product that combines the two, and actually works pretty bloody well.

Of course, in three or four months the true litmus test will come when the hacking community starts to discover the holes in the inbuilt security of XP, but this will mean that firewall manufacturers will have to come out with new software versions that integrate with XP's supposed security feature. For now, at least, sit back and rejoice in the fact that Microsoft has done something right by its users for once. It may be a while until it happens again.

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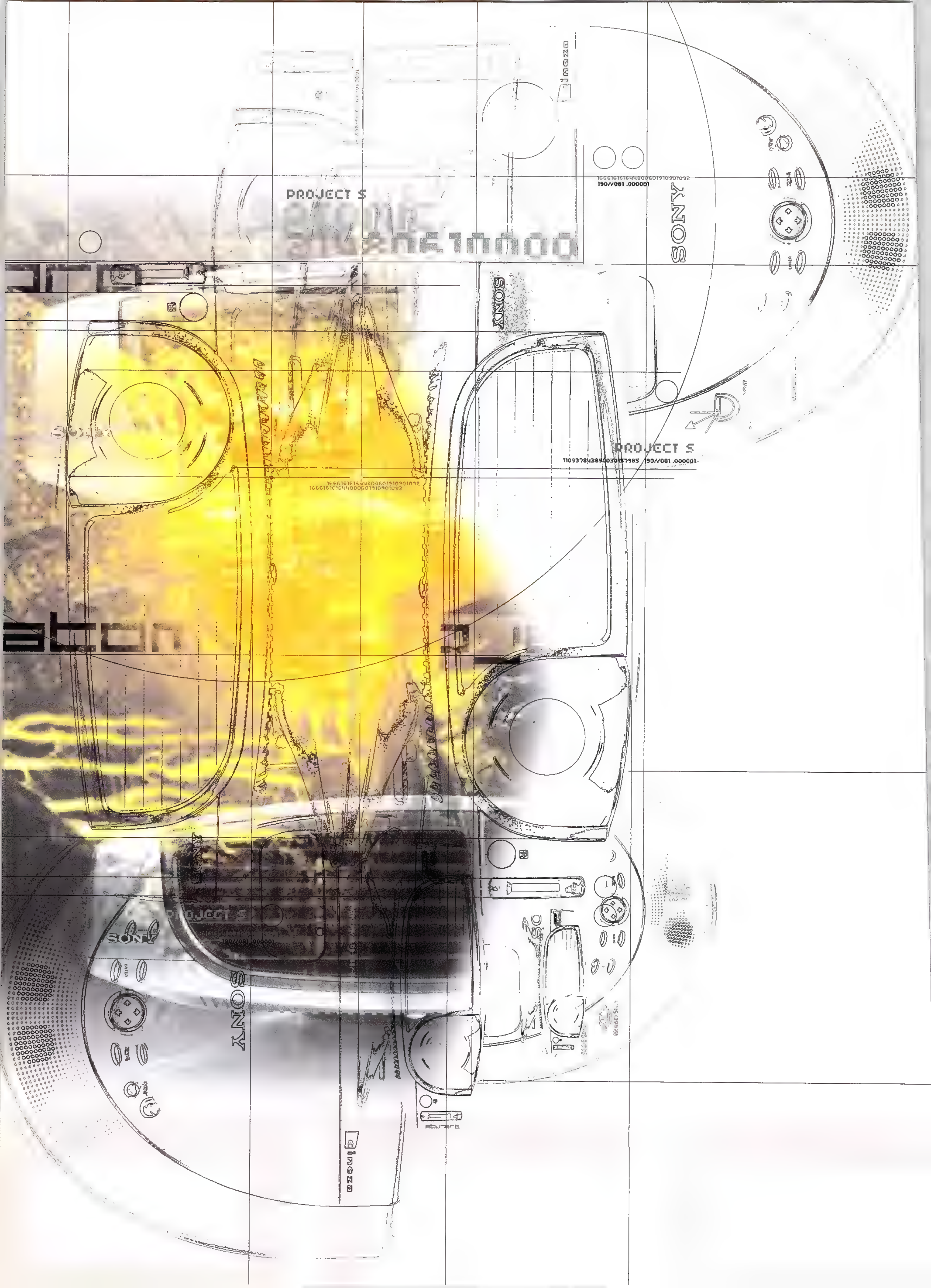
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REVIEWS

I want candy

What is it about gaming? For some it's escapism, for others it's that 'gameplay' thing. For Bennett Ring it's hot graphics.

If I tell you something, promise you won't tell anyone else? My hard-earned reputation as a hard-core gamer could be damaged by this revelation, so you can understand the need for discretion. Here goes – I love eye candy. Not just *like*, but love. I crave bigger, better and more detailed graphics engines. To me, there's nothing better than gorgeous graphics to suck you right into a game.

After all, the visuals are the primary interface between the game and the gamer, so it's pretty darn important that they look good. This is probably why I'm one of the few people in this world who is still incredibly excited about VR, as I see the 2D monitors we use today as a major barrier to that feeling of being immersed in a game. It's gotten to the point where, if I see that a game can't run with at least a 1,024 x 768 resolution (and there is a surprising amount of sprite-based newly release games that don't), I won't even bother firing up the game. Have you seen how awful 800 x 600 looks on a 19in monitor?

But it seems that this love of graphics is perceived as 'uncool' among many old-school gamers. Often when I'm extolling the graphical delights of the latest game to use the Quake 3 engine to a gaming pal, they'll roll their eyes, spit a goober on my shoe and then explode into a passionate lecture about the 'good old days' when gameplay came first and graphics a distant second.

It usually turns out that these guys are running a Pentium II 266MHz with an Intel 740 video card, and then it all becomes crystal clear.

You see, they're the sort of people who don't want to upgrade every 18 months. So they don't get to play the Max Payne's and Tribes 2's of this world. But to make themselves feel better about missing out on the transparent polygons and volumetric lighting effects that the rest of us have come to expect, they argue that too much time is now spent focusing on visuals, and not enough on gameplay. While this argument might have been true when 3D game engines began to proliferate faster than a pair of rabbits, it is no longer the case. In fact, the move to 3D has actually deepened the gameplay, and opened up many gaming genres not previously possible with a 2D graphics engine.

Perhaps this is the reason first person shooters are seen as a newbie genre. After all, they tend to be the most impressive games to look at. I can't remember the number of times I've been flying an online sim, only to be heckled and jeered at when explain that Counter-Strike requires just as much strategy as any flight sim.

Try to explain to them the fact that first person shooters are one of the most popular genres around, and it's soon countered with something along the lines of 'Well, there are a lot of shallow, superficial idiots in this world'. Bah humbug to that, I say.

It's time this graphics bashing and, to a lesser extent, first person shooter bashing stopped. If it weren't for the advent of the 3D engine, we wouldn't have had 2GHz CPUs for several years to come, with a dedicated graphics processing unit helping your mega CPU along the way. John Carmack would be just another unknown computer nerd, and we'd all be thinking our S3 video cards were still the ultimate in graphics hardware.

We'd probably all have a little bit more money in our wallets as a result, but who needs cash when you spend most of your time in front of your PC monitor? I'm not saying we should forget about gameplay, but I think it's time we give credit where credit is due.

So the next time you see some totally amazing visuals, don't immediately assume that this came at the expense of gameplay. And if you're one of those gamers who equate beautiful with lightweight, I say to you, go and upgrade you cheapskate – and discover what the rest of us have known for a long time now. May you know the joy of a 3D engine that demands the latest in computer hardware to run faster than four frames per second.

You might have to pimp your granny to afford it, but trust me, you'll never look back.

Atomic benchmarks

Take a look inside the Atomic Labs testing procedures.

Here at Atomic it is our primary intention to give you the final word on the latest in hardware and PC technology. An integral part of determining the performance of a particular piece of hardware is benchmarking, and this is something we take very seriously in the Atomic Labs.

SYSmark2001

SYSmark is a product of the collaboration between industry group BAPCo (www.bapco.com) and MadOnion (www.madonion.com). It is the first of the next-generation application benchmarks and is designed to more accurately replicate the day-to-day workload that a system is subjected to. The benchmark focuses on Internet content creation and office productivity tasks in order to generate a final rating.

SiSoftware Sandra 2001 Professional

Sandra, from SiSoftware (www.sisoftware.co.uk), is a comprehensive benchmark and diagnostics utility. It contains dozens of special module applets that retrieve detailed information about the specifications and settings of a system, by polling each component's built-in firmware or BIOS. Sandra also features a small suite of synthetic benchmarks for specific components such as CPU, memory, CD-ROM and hard disk. It also features a burn-in wizard for stress-testing overclocked systems.

3DMark2000 Pro

3DMark2000 Pro from MadOnion (www.madonion.com) is a powerful benchmark for testing Direct3D performance, and is the successor to the popular 3DMark99 MAX. Although it is a synthetic benchmark, it uses the advanced MAX-FX 3D engine from Max Payne, which is representative of the latest in Direct3D performance and technology.

3DMark2001 Pro

3DMark2001 Pro from MadOnion is the next progression of the popular benchmark. It also uses the MAX-FX engine and heavily emphasises DirectX 8.0 functions, including programmable shaders. The results are not comparable with results from 3DMark2000 Pro.

Video2000

Video2000 is another MadOnion product designed to test video card performance. It doesn't measure 3D performance, but instead focuses on visual quality and video decoding performance.

Quake 3: Arena AtomicMPC Demo

Quake 3: Arena (Q3A), from id Software, is the very popular first person shooter representing the latest in OpenGL gaming technology. Q3A has a built-in benchmarking utility and built-in demos that can test graphics card performance. These demos are fairly simplistic, and are not representative of the worst conditions that the game can offer to a graphics card. So we developed our own AtomicMPC Demo that pushes the hardware as far as possible.

Other benchmarks

Sometimes we need to break down the tests into more specific areas, such as hard disk performance, or a particular facet of 3D like T&L or SSE. For these specific purposes we can draw on a vast number of applications, games and dedicated benchmarks such as CD Speed 99, DisplayMate, Evolva, MDK2, Adaptec ThreadMark, Aquamark or Serious Sam. Whenever we use one of these special benchmarks we will outline the nature of the tests, the testing procedures and any settings we use. ▢

atomic testbench specs

There are two testbenches in the Labs: one for running AMD processors and one for Intel processors. Both run Windows Me, DirectX 8.0a or DirectX 8.0, LiveWare 3.0 for Windows Me, and Detonator 12.41 drivers.

- **AMD Athlon Thunderbird 1GHz system – ASUS A7V133 motherboard**
- **Intel Pentium III 1GHz system – ASUS CUSL2 motherboard**
  (Both systems supplied by CASSA, www.cassa.com.au)
- **Intel Pentium 4 system – ABIT TH7 RAID motherboard**
  (Supplied by ABIT, www.abit.com.tw)

Common components

- **Transcend 128MB PC133 CL2 SDRAM** (Supplied by CASSA)
- **Transcend 128MB PC2100 DDR RAM** (Supplied by CASSA)
- **Samsung 256MB PC800 RDRAM** (Supplied by CASSA)
- **20GB Ultra DMA/100 7,200rpm hard disk drive**
- **Hercules Prophet II GTS 32MB** (Supplied by Guillemot, www.hercules.com)
- **Sound Blaster Live! Player** (Supplied by Creative Labs Australia, www.creaf.com)
- **ASUS 12x DVD-ROM** (Supplied by CASSA)
- **Floppy disk drive**

Benchmark settings

3DMark2000 Pro

- 1,024 x 768, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer
- 1,024 x 768, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer
- 1,600 x 1,200, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer
- 1,600 x 1,200, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer

Quake 3: Arena AtomicMPC Demo

All tests use Quake 3 1.27g

- CPU: 320 x 240, maximum geometry detail, minimum graphics settings, high sound quality
- Graphics cards: 640 x 480, normal quality graphics settings, high sound quality
- 1,024 x 768, maximum graphics settings, high sound quality
- 1,600 x 1,200, maximum graphics settings, high sound quality

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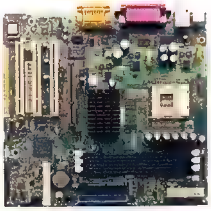
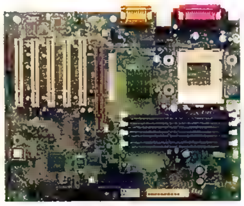
Intel 845



MX4BS

- Intel 845 chipset, Micro ATX
- Support PC133 /PC 100 SDRAM to 3GB
- Intel 10/100Mbps LAN onboard
- IDE 33/66/100 support
- 3D Audio onboard

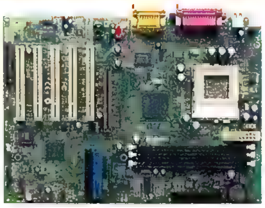
Intel 850



AX4T

- Intel 850 chipset for socket 423 P4
- Support PC800 RDRAM to 2GB
- Intel 10/100Mbps LAN onboard
- IDE 33/66/100 support
- 3D Audio onboard

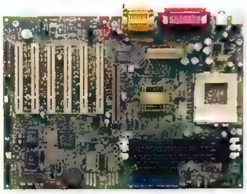
Intel 815E B-STEPPING



AX3S-U

- Intel 815E B-steping chipset for all PIII CPU
- i752 3D AGP onboard
- 4X AGP Port
- IDE 33/66/100 support
- 3D Audio onboard

Intel 815EP B-STEPPING



AX3SP-U

- Intel 815EP B-steping chipset for all PIII CPU
- 4X AGP Port
- IDE 33/66/100 support
- 3D Audio onboard

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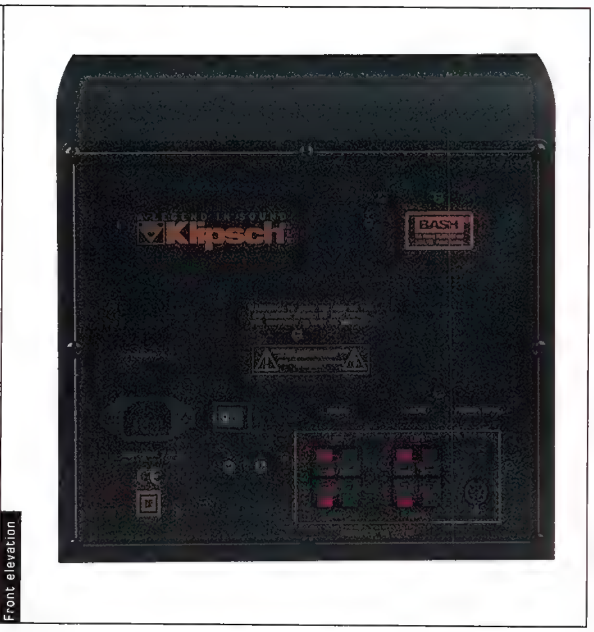
Klipsch ProMedia 4.1

Matt Overington does the sonic boom, even though he can't pronounce the name 'Klipsche'.



Klipsch is far from a newcomer to professional-level speaker packages. The American speaker manufacturer is probably best known for winning the contract to supply speakers to the Hard Rock Café chain the world over, as well as fitting speaker systems for venues such as The Capitol Theatre in Sydney.

As well as designing speakers for professional applications, Klipsch also produces a range of THX-compatible home and computer speaker systems at affordable prices. The Klipsch ProMedia 4.1 system is replete with four individual satellite speakers and one subwoofer, and a control pod is present on one of the four satellite speakers, enabling you to balance the sound output by each speaker group (surround, subwoofer or main volume).

It's refreshing to see a company like Klipsch listen to the feedback from its customers, and actually apply the improvements suggested by users to future releases of its products. The Klipsch speakers are constantly being redesigned and improved. Although the ProMedia 4.1 system appears identical to the previous release from Klipsch (the ProMedia 2-400), minor updates have been made based on feedback from users of the original design.

One modification that was made was to the crossover levels for low, mid-range and high tones, meaning that each speaker's engagement point is lower and the sound output is more balanced – there's a smooth balance between low, mid and high ranges. The biggest improvement, however, is the inclusion of Walkman-style input and output jacks on the control pod, which means that you can easily plug in a set of headphones – or even an external device such as an MP3 player or CD player – without reaching around behind your computer.

The Klipsch design uses a bridged amplifier/switching hybrid (BASH) amplifier design, which is essentially a conventional (Class-D) amplifier that is fitted with a digital switching power supply. This makes it more efficient at eliminating stray current and distortion. A BASH design is by far the most efficient for computer use, as the relatively high fidelity output of most modern sound cards can be in part negated by comparatively inefficient (Class-D) speaker amplifiers.

The sound output by the speakers is extremely impressive, and loud. Very loud. The spec sheet of the speakers indicates that it is capable of outputting a peak of 110dB, which is loud enough to do permanent ear damage if you expose yourself to those levels for long periods of time. What this means, however, is that you have heaps of headroom with the Klipsch system. You never need to turn it up to maximum volume, so you never experience clipping from overloading the speakers.

Many PC speaker packages focus too much on delivering floor-rumbling bass, with little regard given to mid-range and high-pitched response, thus making them good for gaming, but not for listening to music (the Doom 2 double-barrel shotgun blast doesn't suffer much if you have no mid- or high range). This is not the case with the Klipsch speakers, as their output is balanced across the entire spectrum. The design of the crossover levels is extremely efficient, and there is no determinable loss in sound quality anywhere on the audio spectrum – from punchy bass to full mids and clearly defined high tones. Because of the even response of the speakers, the ProMedia system worked as well for music as it did for gaming – seamlessly. Indeed, this is one of the best speakers that we have ever looked at. If you're in the market for a new set of speakers for your computer, you can't go wrong with the Klipsch ProMedia 4.1 audio system.

SPECIFICATIONS

Four 60W satellite speakers, one 160W subwoofer, two inputs (one stereo and one four-channel)

Web site: www.klipsch.com

Supplier: www.innovision.com.au **Price:** $749

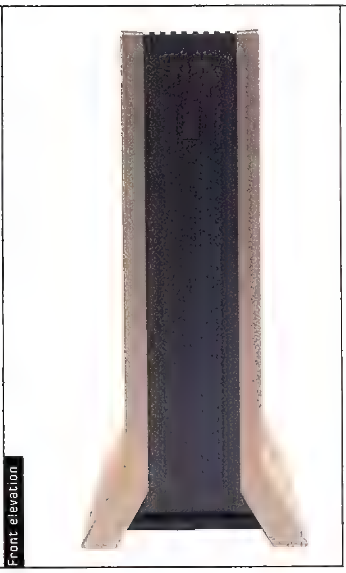
atomic
9/10

Sony SDM-N80

Tim Dean takes a look at something big and flat, and likes it.

Front elevation

Side elevation



Front elevation

The Sony SDM-N80 represents all the latest in terms of TFT technology, and definitely qualifies as a funky piece of kit. In terms of design, the 18.1in screen has slick lines, with brushed chrome and black colouration. The screen is also extremely thin – about 4cm from front to back – because Sony has removed much of the electronics and the power supply from their usual home in the back of the screen, and placed them in a separate external box. This leaves the screen itself being as light and space efficient as possible. The base can also be swivelled 60° left or right, and tilted 59° back.

The external 'media box' looks like a small black and chrome PlayStation2 console, although its function is far more utilitarian in nature. At the back are dual inputs: one with a standard analog D-Sub connector, and the other with a digital DVI connector. Both have audio and upstream USB ports. You can actually hook up both inputs and switch between them through the On Screen Display (OSD). This enables you to control two PCs through the one screen, especially if you're using a USB keyboard and mouse. The final cable out of the media box connects to the back of the screen via a proprietary connector. There is only one cable for both audio and video signal, which reduces the amount of clutter behind your screen. The cable that connects the screen and media box is a little over 1m in length, which means the media box doesn't need to be anywhere near the screen if you don't want it around.

The OSD interface is placed at the top of the screen, which is somewhat unusual for any monitor, but it is well placed and unobtrusive. The six black OSD buttons are small, but only require a gently touch to spring to life, at which point orange backlit labels appear by each button. Very cool. The OSD is fairly easy to navigate and gives you access to most of the functions you will ever need, including manual phase and pitch for adjusting the screen output. Next to the OSD controls are the small built-in speakers. Although they are adequate for basic tasks, they don't have astounding frequency response and they distort at moderate volume.

> **'If the user walks away from their system, the screen will automatically power down.'**

A particularly cool feature is the user sensor, which uses a small infra-red receptor at the top of the screen to detect whether anyone is standing in front of the screen. If the user walks away from their system, the screen will automatically power down. You do have to position the screen carefully, otherwise the keen, but well meaning, sensor will keep trying to turn the screen off while you're in front of it.

Image quality is excellent – well above average for most TFTs – but it's not the best we've ever seen. At the native resolution of 1,280 x 1,024, the image is sharp and clear, with good tonal response resulting in clear whites and solid blacks. Colours are bright and clear, although there are small traces of ghosting in high contrast areas as well as minor vertical streaking. Viewing angle is also excellent. The pixel response time is above average, but it's still a lot slower than CRTs, so you get a bit of blurring. But it is still usable for most games. On the whole, the SDM-N80 is quite simply a pleasure to use.

Perhaps the only negative aspect of this monitor is the price. TFTs are not cheap, and the SDM-N80 is no exception. For $5,599 you could not only buy yourself a 21in Sony FD Trinitron CRT monitor, but also an Athlon 1.4GHz PC with a GeForce3 to go along with it. If you have the cash, however, then you can't do much better than the Sony SDM-N80.

SPECIFICATIONS

18.1in TFT, 1,280 x 1,024 resolution (1,600 x 1,200 max.), 140° horizontal and 120° vertical viewing angle

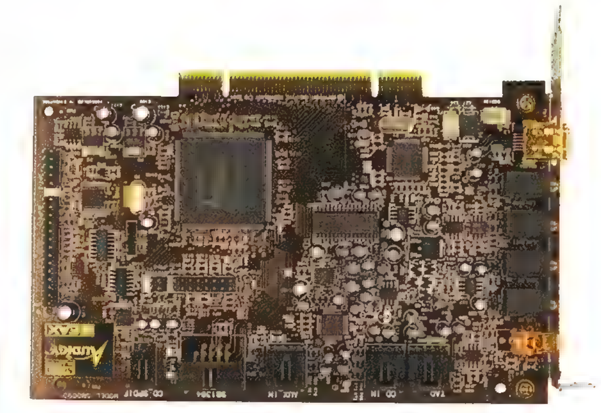
Web site: www.sony.com.au

Supplier: www.sony.com.au **Price:** $5,599

atomic
8.5/10

Sound Blaster Audigy

It's time to boom-boom, shake-shake the room with Bennett Ring.



Top elevation

Front elevation

When we think of sound cards, there is one company that stands head and shoulders above the rest. Creative has been working its magic since the dawn of PC sound, giving gamers more realistic effects and higher levels of sound quality with each iteration of its Sound Blaster series. The successor to its potent Live! cards has at last arrived, after several years of development, in the form of the Audigy.

The first feature your ears will appreciate is the 24-bit/96kHz digital-to-analog converters, which result in an impressive signal-to-noise ratio (SNR) of 100dB. So no matter how high you crank up the volume, the sound quality is always crisp and clear, providing you've got high-quality speakers to match. This level of SNR is usually only seen in expensive, professional-level sound cards, so Creative must be applauded for applying this level of sound quality to the home PC at an affordable price.

The EMU10K1 Digital Signal Processor (DSP) used in the Live! series has been replaced with the Audigy processor. This DSP is four times more powerful than the EMU10K1, which allows for an enhanced set of EAX effects known as EAX ADVANCED HD. This allows for a gamut of new environmental effects, including Obstruction, Occlusion, Exclusion, Environment Reflection, Environment Panning, Environment Morphing, and Extreme.

The majority of these aren't really noticeable, with the exception of Environment Reflections and Environment Morphing. EAX ADVANCED HD also makes it possible to have four different sound sources, each with its own environmental effects. So if you are in a large metallic room, but can hear the sound of a zombie wailing from inside a well outside, the wail will have both the well effect as well as the metallic room effect. This results in a more realistic 'soundscape'. But there's a slight problem with EAX ADVANCED HD. Just as with SSE2, hardware T&L and even the original EAX standards, it's going to take time before game developers use this proprietary standard. Currently, there isn't a single title on shop shelves that supports this new standard, and we're willing to bet it will be another year at least before it becomes commonly used.

In terms of inputs and outputs, the Audigy has it all. This card is perfect for those with external Dolby decoders as well as those who don't have decoders but have 5.1 speakers, as it has both analog 5.1 outputs and a digital 5.1 output. One of the most impressive I/O ports is the inclusion of an SB1394 port on an additional daughterboard, which is based on the IEEE 1394 standard. This will enable you to hook up most FireWire devices directly to your Audigy card – provided it has been SB1394-certified by Creative – negating the use of an additional FireWire card. This inclusion of the SB1394 port should be considered pure genius on Creative's part.

> 'So no matter how high you crank up the volume, the sound quality is always crisp and clear . . .'

Just like the Live! series, the more expensive Audigy packages ship with an external I/O drive known as the Audigy Drive. This includes all of the standard I/O options that can be found on the external Live! drive, as well as a pass-through SB1394 port that connects to the SB1394 port on the card.

The final two noteworthy features are Audio Cleanup, which removes white noise from recordings, and the Dream feature, which is surely the most annoying feature created for any product, ever. It basically divides a song into three streams: low, mid and high range, and then rotates the output from each stream around the 3D listening space. It must be heard to be truly hated.

We ran the same benchmarks on the Audigy as we ran in our sound card round-up last month, and its CPU utilisation and game performance were almost identical to the Live! cards. In a word, impressive.

The Audigy will ship to Australian shores in three different packages: the Platinum eX at $599 with an external Audigy Drive, the Audigy Platinum at $499 with an internal Audigy Drive, and the Digital Entertainment pack at $249 without an Audigy Drive. Each pack also has different software included.

It seems that Creative has raised the bar once again for home PC audio. Unfortunately, the EAX ADVANCED HD effects won't be seen in games in the near future, but the Audigy still offers unbeatable features and sound quality at a very affordable price, especially without the external Audigy drive. ▢

SPECIFICATIONS

Both analog and digital 5.1 outputs, SB1394 I/O port, EAX ADVANCED HD effects, 100dB SNR, 24-bit/96kHz DACs

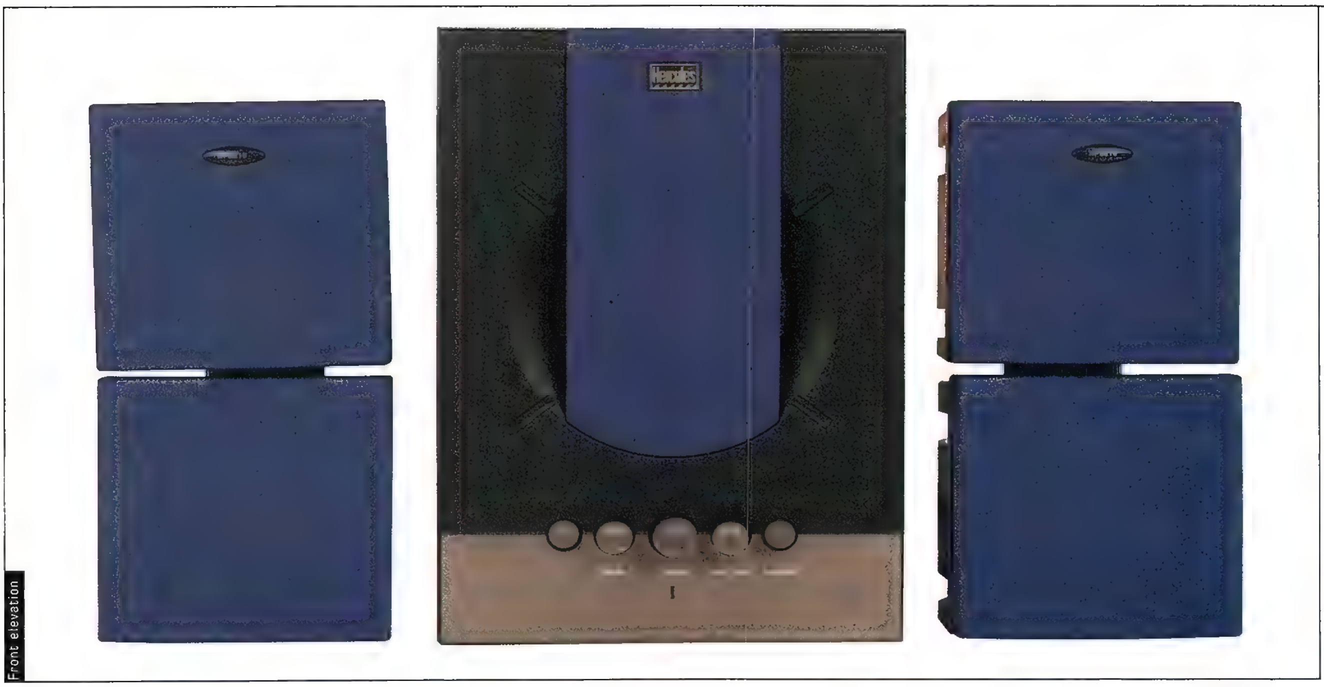
Web site: www.creative.com

Supplier: http://australia.creative.com **Price:** $249-$549

atomic
9/10

Hercules XPS-210

Simon Peppercorn tunes into the sounds of this low-priced speaker kit.



Guillemot is well known for its multimedia range of hardware. More specifically, its subsidiary company Hercules, which it acquired in 1999, is renown for its range of 3D Prophet graphics cards, along with the popular Thrustmaster range of gaming devices and accessories that have impressed gaming nuts for years. Guillemot has also brought us the Maxi line of multimedia devices, including graphics, sound and DVD, although all of the Guillemot video and multimedia goodies now come under the Hercules banner.

This year Guillemot announced that it will be devoting its efforts entirely to hardware and accessories for the home user and gaming enthusiast, aiming to be among the top three manufacturers in its field by the year 2003.

The Hercules line recently delved into sound, with the release of the Hercules Game Theater sound card and rack, and the Hercules GameSurround Muse. Until now, however, Hercules was a stranger to the PC speaker scene. Taking the plunge, it has released a range of speaker kits aimed at the home user/gamer. Both the XPS-510 and the XPS-210 kits will be available to the Australian market by mid-October. At the time of writing, it is unclear whether the XPS-200 will be available in Australia. The XPS-510 is expected to retail for around $199. Designed with a sleek, classy and modern appearance, black housing, grey trim and blue speaker covers, there is instant aesthetical gratification when you remove these speakers from their packaging.

Setting up these speakers is as easy as you would expect. The cables from the satellites are fixed and connect directly into the rear of the subwoofer. A standard analog stereo cable from the sub to your sound card and a standard power connection completes the task.

The subwoofer runs at 30W RMS and the dual satellites are at 10W RMS each. This is more than enough to upset your neighbours or damage your hearing, whichever comes first. Interestingly, the subwoofer in this kit is more powerful than the subwoofer in the XPS-510 kit, which is only 20W. The satellites comprise of a tweeter and a mid-range each. To enhance the 3D effects the top half of the speakers can be pivoted up to 90°, allowing the tweeters to be positioned independently.

The output from this three-piece system is a very clear and natural sound, with barely a trace of distortion and only minimal bleeding of ears at full volume. This is an ideal kit for gamers, with a rich, rumbling bass and clear high-end tones. Sound reproduction, particularly at the lower end of the frequency spectrum, is suitably impressive considering the size and price of the kit. A bass and treble dial is present on the subwoofer's control panel, along with a 3D on/off switch. Notably missing from the kit is a digital input but, hey, what do you want for 119 bucks? The subwoofer doesn't allow for the connection of extra satellites, as is found in other similar speaker systems.

Readers looking for a new set of mid- to low-priced speakers should consider this offering from Hercules. There are certainly better speakers out there, and most times you get what you pay for, but the XPS-210 represents excellent value for money and is certainly top of its class for this price range.

The kit supports DirectSound 3D, EAX 1.0, EAX 2.0, A3D 1.0, I3DL2, MacroFX, MultiDrive, ZoomFX and EnvironmentFX sound cards and comes with a three-year exchange warranty. ▢

SPECIFICATIONS

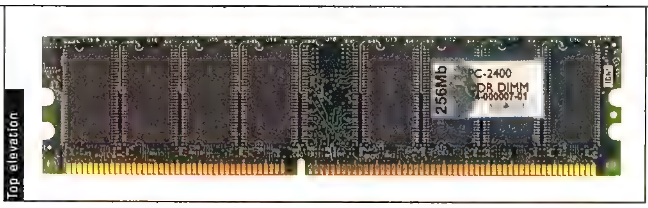
Total output power: 50W RMS; treble, bass, volume, 3D on/off switch; subwoofer enclosed in wooden case

Web site: au.hercules.com

Supplier: www.guillemot.com.au **Price:** $119

atomic
9/10

Odin 300MHz DDR SDRAM



The next instalment in 3DPower's line of gamer-focused hardware is the Odin 300MHz DDR SDRAM package. Arriving in what is perhaps the worst example of excessive packaging we have seen, the box is the size of most game boxes and contains one 256MB stick of DDR RAM and a disposable anti-static strap.

This is forgivable, because the RAM itself is worthy of such a grandiose gesture. The memory sticks used for the Odin RAM come from the highly respected Corsair, who has a reputation for manufacturing fine overclocking RAM. The actual chips used are made by Micron.

Whereas the current DDR standards are PC1600 (200MHz DDR) and PC2100 (266MHz DDR), the Odin RAM has been tested and certified to run at 300MHz DDR, which is perfect for overclocking via the frontside bus. The other major point to note is that the RAM is CAS 2, rather than the more common CAS 2.5 DDR SDRAM. This allows for more aggressive memory settings, and gives a noticeable, albeit small, boost in performance over RAM running at a higher CAS rating.

In our tests the RAM performed admirably. There were no problems when running at CAS 2, and it stayed stable throughout FSB overclocks. The Micron DDR modules used for the chip come highly recommended and are known to be a lot more stable than some other brands. When you are trying to squeeze that last drop of performance out of your memory, stability is a very handy thing to have.

The downside of such high-quality RAM is that it costs more than the everyday stuff. A lot more. In fact at the time of writing the Odin DDR RAM was more expensive than 256MB of PC800 RDRAM This is not a huge problem considering RAM prices are dropping day by day, but the RAM bubble has been set to burst for some time now. In light of recent drastic measures being taken by RAM makers to stay afloat, and the flow-on from recent floods in Taiwan, this could happen sooner rather than later.

In fact, the only thing keeping this product from scoring an Atomic Hot award is the price. It's hard to fault any other aspect of this RAM, with its high speed and reliable performance. But with the market being so tight there are plenty of cheaper solutions. With the Odin DDR RAM 3DPower has taken one of the highest quality and fastest brands of RAM and made it more accessible. As long as you can swallow the price, Odin puts forward a strong case for quality over quantity.

SPECIFICATIONS

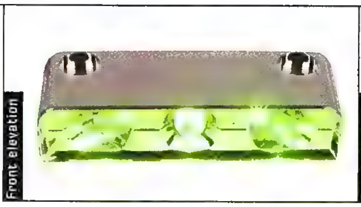
Corsair CAS 2 PC2100 DDR SDRAM rated to 300MHz, disposable anti-static strap, huge cardboard box

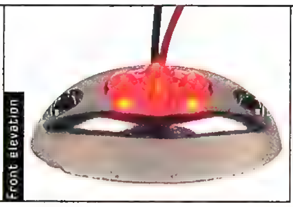
Web site: www.3dpower.com

Supplier: www.innovision.com.au **Price:** $269

atomic
8/10

LaserLEDs





These LaserLEDs from PC Case Gear come in two different styles. There is a three-light spread pattern and a four LED light cluster. Warning: these are bright, as in, hurt-your-eyes bright. They were actually developed to give a new look to motorcycles at night, and are now being sold as lights for case mods.

The three-light spread pattern has one centre LED with the other two pointing out at 45°. This gives the best coverage of light. The four-LED cluster is set in a diamond pattern for maximum illumination. The LED cases themselves come in chrome, black or white and are supplied with two screws each.

The idea here is that you attach them to the front of your tower and they shine downwards, giving a rather funky look to your system, especially in a darkened room. You could also mount them inside your case, but with all the other lighting systems you probably have in there by now, these may be a little redundant. They are currently available in blue, green, red, but can also be found in white and amber.

The blue bulbs glow at an average of 3 candelas (cd), the red pumps out 4cd and the green a huge 10cd. For those who don't know exactly what a candela is, it is defined as a unit of luminous intensity equal to one-sixtieth of the luminous intensity per square centimetre of a blackbody radiating at the temperature of the solidification of platinum. Alrighty then.

Don't worry about melting any of your l337 case painting skillz. Drawing only around 26mA at 12V, these LEDs don't seem to get hot at all and won't cause any undue stress to your already taxed PSU.

Measuring about 40mm in length and 15mm in width, they are the smallest lighting solution we have seen at Atomic. They are also fitted with standard 4-pin Molex connectors and are an absolute snap to install. You could either use double-sided tape or break out your drill and screw the little suckers on. It's totally your choice.

The packaging claims that they are waterproof. This is useful, as we often shower with our computers and take them skinny dipping in the summer. Still, the piercing brightness of a good LED contrasts nicely with soothing neon glow sticks.

SPECIFICATIONS

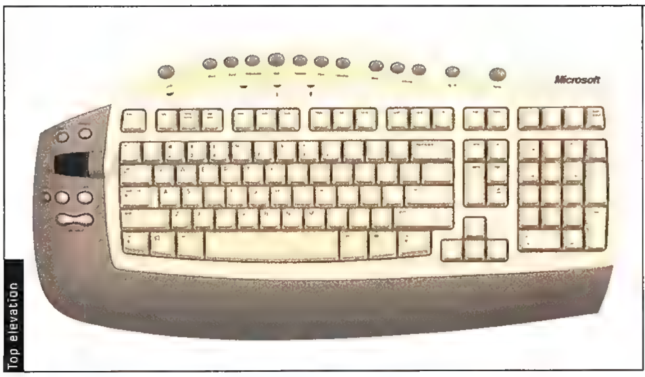
Low heat output, 200,000-hour life (22 years), waterproof, shockproof, 12-14V DC, less than 26mA at 12V

Web site: www.pccasegear.com

Supplier: www.pccasegear.com **Price:** $35 each

atomic
8/10

Microsoft Office Keyboard



As you can see from the picture above, the Office keyboard is one mother of a keyboard. At 52 x 25cm, this keyboard is easily the largest to have ever graced the Atomic Labs. So if you're after a compact keyboard to fit on that cluttered desk of yours, this keyboard probably won't fit without the creative use of a hacksaw and some particle board debris.

The reason the keyboard is so large is the addition of a 'single touchpad on the left-hand side of the keyboard, as well as a row of 12 hotkeys above the regular function keys. This pad has several hotkeys for the regularly used actions of cut, copy and paste, as well as buttons for forward and backward.

Most notable is the large scroll wheel, a surprising inclusion considering the proliferation of mice with scroll wheels. Just underneath the scroll wheel is an 'application switcher'; basically a large rocker switch that performs the same job as the Alt-Tab key combination.

The hotkeys above the function keys are used for opening applications, along with volume controls and others for logging off and putting your PC to sleep. More interestingly is the addition of an F-lock key. With this engaged, the function keys operate as per usual; with it off they become shortcuts for commonly used operations within applications such as Word and Excel. One of these shortcuts is to the Microsoft Office XP Web site, a sly attempt to draw more customers to Office XP. Thankfully, these additional keys can be reassigned to user-defined operations and applications. The inclusion of (,) , = , Tab and Backspace keys to the numeric keypad will be a definite bonus to those who have the exciting job of data entry.

While all of these keys will be very helpful to the computer novice, those who are used to right-clicking or using key combinations will probably stick with what they know, and won't venture near the new keys. Its score of only 6 out of 10 reflects that this board isn't one for the tech-savvy Atomican. But if you have to endure the joys of data entry, this is the board your fingers have been craving.

SPECIFICATIONS

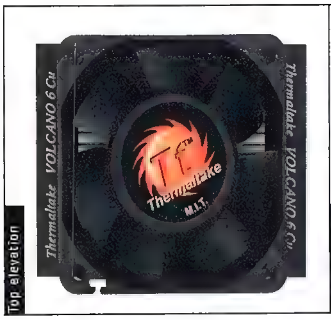
USB keyboard with PS/2 adaptor, 52 x 25cm, wrist rest, single touchpad, scroll wheel, application shortcut buttons

Web site: www.microsoft.com

Supplier: www.microsoft.com **Price:** $129.95

atomic
6/10

Thermaltake Volcano 6Cu+



We've checked out quite a few heatsink fan (HSF) units in the last couple of months, and have been amazed by how loud the better performing units are. It seems that if you want to cool your CPU well, especially those made by AMD, you're going to have to put up with a case that sounds like it's home to a hive of bees. The Volcano 6Cu+ is yet another of these noisy creations, but can it offer the brilliant performance levels we've seen from some of the more recent units?

At 390g, this is one of the heavier aluminium heatsinks around. This is due to the large size of the unit at 80 x 60 x 40mm, as well as the round copper slug embedded in the bottom of the heatsink. Due to the significant size, those with cluttered sockets will want to check that it will actually fit before purchasing it.

It must be said that the clip on this HSF is perhaps the simplest we've ever used; it doesn't require the Herculean force that so many other socket coolers need. After applying a thin layer of Arctic Silver, we attached the HSF to a 1.2GHz Athlon running at default voltage on our A7V133 reference motherboard. Ambient room temperature was a constant 24°C. We also re-tested our GlobalWIN FOP38 heatsink fan to compare with the Volcano 6Cu+.

Unfortunately, the performance levels of this HSF didn't match the noise levels of the 7,000rpm fan. After looping the Sandra CPU burn-in for 30 minutes, a temperature of 58°C was recorded, which is slightly higher than the 56°C the FOP38 recorded. The difference in idle temps was also 2°C, with the Volcano 6Cu+ reaching 55°C while the FOP38 reached 53°C. This is even more surprising considering the larger size of the Volcano and the copper slug in its base.

We're left with the impression that this HSF is decidedly average. Thermaltake is going to have to pick up its game if it doesn't want to get left behind in the flooded HSF market.

SPECIFICATIONS

Copper and aluminium construction, 7000rpm ball-bearing fan moves 38cfm. Weight: 390g

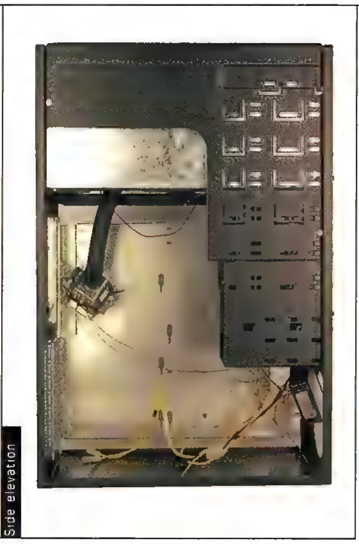
Web site: www.thermaltake.com

Supplier: www.auspcmarket.com.au **Price:** $44

atomic
6.5/10

VapoChill PC case

John Gillooly loves measuring his CPU temps in Kelvin.



> **'After the CPU is installed you need to cover the area above the pins with a special powered heating element that keeps them warm and prevents condensation on the underside of the motherboard . . .'**

Forget those pissy little copper heatsinks. Forget lightweight water-cooling solutions. The real way to cool a CPU is to refrigerate it. Refrigerated cooling, pioneered by companies such as KryoTech, has been around for a while now. But it's always been hard to source these solutions here in the land of expensive freight.

Enter Danish company asetek, maker of a very different kind of whitegoods. Its flagship product is the VapoChill, a refrigerated CPU cooling solution masquerading as a big, heavy ATX case. The current model of the VapoChill case is part of a constantly evolving design and is supposed to keep a CPU running at a chilly -15°C.

The VapoChill is available with CPU cooling blocks designed to support either Athlon or Pentium 4 CPUs, with a new block being designed to support the 478-pin Pentium 4 processors.

The case design places the compressor and radiator at the top, which means that the case is top heavy. This is not a huge problem, as the VapoChill is not intended to be a mobile LAN box, rather permanently located in the one place. The location of the compressor and radiator does seem strange (the latest KryoTech systems have the unit at the base), but this means that the large amount of heat generated by this assembly does not affect the temperature inside the case too much (for as we all know, hot air rises).

The business end of the cooling system is the patented refrigeration block used. The rather large assembly uses a copper contact with the CPU covered with insulation. When mounting this block, as with any other ultra-low temperature solution, you need to insulate the socket to prevent condensation. In order to do this, asetek supplies with the case heat conduction compound that is designed to be smeared all over the inside and pin holes of the CPU socket. The inside of the socket is then filled with a small piece of foam insulation. After the CPU is installed you need to cover the area above the pins with a special powered heating element that keeps them warm and prevents condensation on the underside of the motherboard. This is your biggest concern with any sort of refrigerated cooling system, including Peltiers.

The block is then mounted and the cooling system is plugged in. Rather than the system starting up at the same time as the system boots, it initialises the cooling first and then, once it is chilly enough, starts the computer. This may be around two minutes for the first boot on a balmy spring morning or only a few seconds if the system has recently been running.

The case also contains a temperature readout, so you can grin smugly and show friends just how cool your CPU is. From our testing we found that the CPU idled at around -15°C and warmed up to -9°C when under load. Using this system we were also able to get a 1.7GHz Pentium 4 running stable at 2.125GHz using only a frontside bus overclock. This is, of course, the only way you can overclock an Intel processor – gotta love locked CPU multipliers. With a bout of more intense tweaking the processor easily made it up to over 2.2GHz.

The downside to such an awesome cooling system is the relative difference between cost and functionality. The already expensive case is almost crippled by the huge freight costs that Australians seem to suffer with hardware that comes from places other than Taiwan. The flipside is that this is purely a CPU cooling system. Unlike some other setups such as the American-made Koolance integrated water-cooling case, which cools the CPU, PSU, hard disks, video cards (and, hopefully, in the future your beers) or the Atomic fridge PC, which cools the whole setup, the VapoChill is purely designed to suck unwanted heat out of a processor.

For $1,900, you need to be really, really keen to get your CPU below zero. Given the effectiveness of water cooling or even just well-thought-out air cooling at a fraction of the cost, it is incredibly difficult to justify such a layout. That said, this is the ultimate in commercial cooling systems, and it rocks. Plus your friends will move beyond the world of envy into hatred when they see your shiny new beast.

SPECIFICATIONS

Three 5.25in drive bays, three 3.5in drive bays, refrigerated cooling, temperature display

Web site: www.vapochill.com

Supplier: www.cdt.com.au **Price:** $1900

atomic
8/10

Saitek X45 HOTAS kit

Armchair flight lieutenant Bennett Ring checks out Saitek's latest.

Top elevation

Back elevation

Side elevation

When flying a modern PC flight sim, there's nothing like a good HOTAS setup to make you feel like your butt is actually strapped into a Martin-Baker zero-zero ejection seat. For those of you who haven't heard the term before, HOTAS stands for Hands On Throttle And Stick, and enables a pilot to operate all mission critical controls without having to remove their hands from the stick or throttle. When it comes to PC sims, not having to use the keyboard means you can keep your eyes focused on your targets, and a separate throttle control is a major bonus during up-close-and-personal sky confrontations (or 'dogfights' as the pros call them). The latest HOTAS setup to hit our shores is the Saitek X45 Digital Joystick and Throttle kit.

After plucking ourselves from the dreamy haze induced by the smell of new hardware, the simple task of installation began. The throttle unit plugs directly into the joystick, which then plugs into your PC via a single USB port. You'll need to install the Saitek Gaming Extensions software first. This application lets you assign up to 250 actions to button presses on the HOTAS device, as well as configuring a different auto-executing button configuration for each sim that you play. So you won't have to go through the laborious and time-consuming task of loading up your different key configurations depending on which game you're playing ever again.

Both the throttle and the joystick are constructed primarily of black plastic, and lots of it. As with all HOTAS kits, both the joystick and the throttle are literally covered with buttons. The joystick has six buttons, as well as two point-of-view (POV) hats. Several of these light up when it is in use, giving the joystick the appearance of a cheap Christmas tree. The throttle has an additional two buttons, a rocker for rudder control, two rotary controls, another POV hat and a couple of sliding mode switches. The mode switches set the other buttons to one of six modes, thus giving you many more actions than there are buttons. To help you remember which buttons do what, a metal plate on the base of each controller has diagrams with button labels. While these diagrams are helpful for HOTAS initiates, they spoil what could have been a very authentic-looking setup. The cheesy plastic missile safe cover over one of the central buttons on the joystick will no doubt be ripped off due to its tendency to cover the button when pulling backwards on the joystick.

Time for the important question: how does the setup feel? The joystick's spring mechanism provides a smooth and fluid range of motion, but it's questionable how long the spring will stay this way. And the multitude of buttons all have that 'I'm gonna break within three weeks' feel to them, which doesn't inspire confidence in the kit's ability to cop a beating. If you're thinking of using the rudder controls on the throttle, think again. It's quite difficult to reach, and you'll need to inject steroids directly into your pinky finger to move it. If you've got separate rudder pedals this won't be a problem, but we would have liked to have used the rotating joystick method for rudder control that Microsoft uses (although there are people who think this method of rudder control sucks as well). The second major problem is, to reach button two on the joystick you have to reach over the first POV hat. This leads to a very uncomfortable hand position on the joystick, as well as regular knocking of the hat switch when hitting button two. I lost count of the number of times I went to fire my cannons in Microsoft Combat Flight Simulator 2, only to hit the POV hat, causing me to look over my shoulder at the most crucial moment. Such a simple flaw, which could have been rectified by moving the POV hat to the top of the stick, costs this setup dearly.

This setup's redeeming feature is its price. At only $199 this is one of the cheaper HOTAS sets available. While this comes at the cost of a couple of design flaws, it is an attractive proposition for those who want a HOTAS setup without having to pay an exorbitant amount of money.

SPECIFICATIONS

Joystick: six buttons, two POV hats. Throttle: two buttons, rudder control, two rotary controls, one POV hat

Web site: www.saitek.com

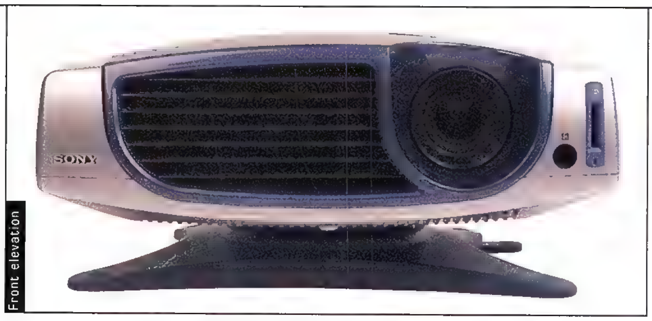
Supplier: www.innovision.com.au **Price:** $199

atomic

7/10

atomic HOT

Sony Cineza



Featuring a rich and clear display, at a reasonable price, this unit is an ideal home entertainment system. The picture clarity is excellent, even at a viewing width of over 2m. Until you've played Max Payne at this size, then you ain't played diddly-squat. Firing up Terminator 2 on DVD for a little home cinema experience was also very impressive. The only thing missing was the overpriced popcorn.

The Cineza has a feature called Side Shot, which allows digital keystone correction for not only vertical adjustments but horizontal as well. It works surprisingly well, and means the projector can sit off to one side, instead of having to be directly in front. The unit itself pivots on its base like a monitor – another welcome feature.

This device accepts a memory stick from your digital camera and other images, which is great for those slideshow nights your friends love to come around to your house for.

As with most projectors, the unit heats up fairly quickly. However, the cooling fans are barely audible when playing games or watching movies. The interface and power supply cables are a decent 5m in length.

You are able to save your settings for each of the different devices you attach to the unit (VCR, PC, camcorder, and so on). This is handy, because you may want different picture and colour settings for your movies than for your games, and you won't need to reconfigure each time. The projector also supports high-definition television (HDTV) signals as well as progressive scan for those who have high-end progressive-scan DVD players.

If you're using the projector for a presentation, the display is bright enough that you don't need to hit the lights, although we found that if the image is fairly dark, some detail is inevitably lost in a brighter room.

Of little use, however, were the 2W stereo speakers built into the unit. The sound quality and volume were both poor. This shouldn't matter too much, however, as you would likely run your sound through a proper sound system.

The only significant problem with the Sony Cineza is that we don't have one for ourselves.

SPECIFICATIONS

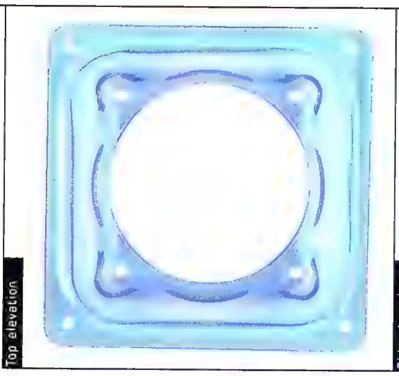
Projection system: three LCD panels, one lens. Lamp: 120W UHP. Mass: approx. 3.9kg

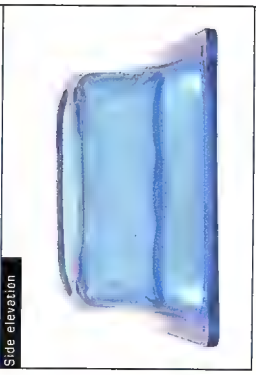
Web site: www.sony.com.au

Supplier: www.sony.com.au **Price:** $5,995

atomic 9/10

CoolPC Fan Adaptor





What's bulky, blue and does sweet FA? Dammit, we knew the product shot above would give it away! We've been hearing for a while now the merits of these fan adaptors, so we thought we'd better check out what all the talk was about. Enter the bulbous contraption above, the CoolPC 60-80mm fan adaptor.

Before mounting the fan adaptor to the GlobalWIN FOP38-1, we left the heatsink fan with the default 6,800rpm 60mm fan in place. We then ran our standard load test (30 minutes of the Sandra CPU benchmarks in looping mode) and idle tests (30 minutes of no activity) with an ambient room temperature of 24°C.

After running these tests, it was time to mount the adaptor with a larger 80mm fan in place, which turned out to be a tricky affair. You see, the fan on the FOP38-1 is usually held in place by a couple of thin wire clips, but the fan adaptor has to be mounted using screws. We eventually got a nice tight fit by screwing these screws between the heatsink's baffles. We then strapped a beefy Sunon KD1208PTBX-6A 80mm 3,900rpm fan on top of the adaptor, which can pump 50.6cfm at a much quieter volume than the 6,800rpm buzz box that is usually mounted on top of the FOP38-1.

With the default 6,800rpm 60mm fan in place, the load temperature reached 55°C, while recording an idle temperature of 53°C. With the fan adaptor in place these temperatures rose to 59°C under load, and 55°C at idle. So it appears that cooling suffered as a direct result of the fan adaptor, although there was a significant drop in the noise generated by the 80mm fan.

In fact, these adaptors are marketed as a solution for noisy heatsink fans. But at $21 each, plus the cost of a new 80mm fan combined with the cost of the heatsink, this is a very pricey proposition. If you want a quiet heatsink, buy a quiet heatsink – not this oversized, overpriced piece of junk.

SPECIFICATIONS

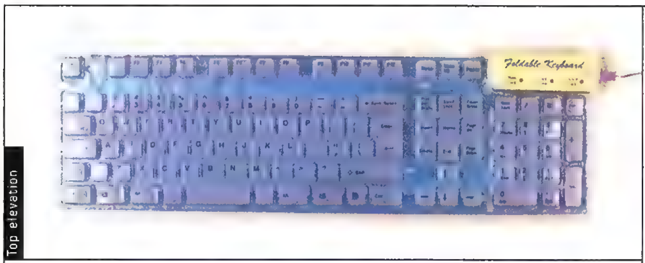
Super-duper air conveyance and transferral device, available in blue, looks ugly

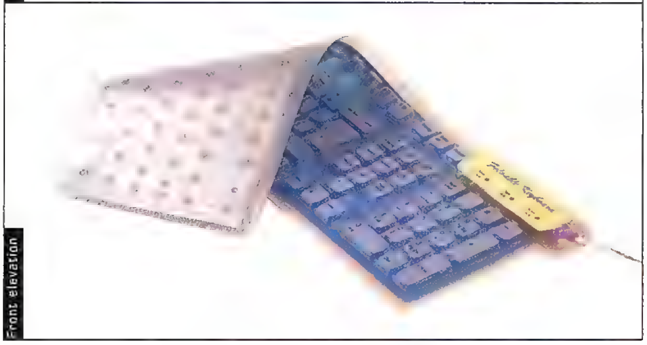
Web site: www.coolpc.com.au

Supplier: www.coolpc.com.au **Price:** $21

atomic 4/10

Coolgreen Fold-2000





From afar this keyboard looks like your average, everyday 101-key computer keyboard. But when the guy demonstrating it wraps it around his head and uses it as a bandanna, you soon realise that it's quite unlike anything you've seen before.

Instead of your regulation beige plastic, this keyboard is constructed primarily of rubber. The translucent rubber base of the keyboard is only a few millimetres thick, enabling you to roll the keyboard up like some kind of demented IT kebab. When you want to use it, you simply plug in the PS/2 connector and lay it out on a hard, even surface.

The use of a flat typing surface is preferred, although it is still possible to use the keyboard on something as uneven as your lap, albeit at the cost of comfort. The keyboard's main circuitry is located in a small section in the top right-hand corner, which, incidentally, is the only section of the keyboard that does not bend. Due to the use of translucent rubber, all of the components are shown off in a way that even Mac lovers would be proud of.

Unfortunately, there is a slight problem with this keyboard as a direct result of the rubber construction. Basically, the keys offer about as much resistance as melted butter. Instead of the reassuring 'click' that keys on standard keyboards make when you press them, each key feels incredibly soft – almost to the point where the keys won't pop back up. This makes it infinitely harder to touch-type, as well as making it a rather uncomfortable keyboard to use.

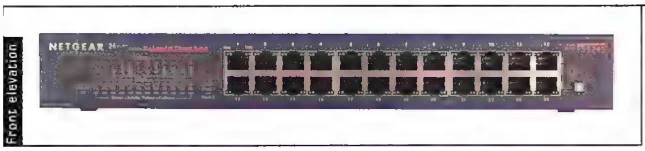
The Foldable Keyboard could be handy for those who need a portable keyboard, but at the hefty price of $99 – not to mention the disappointing construction and feel – this niche item works better as a piece of abstract art than an input device. ▢

SPECIFICATIONS

101-key keyboard, primarily rubber construction.
Weight: 205g
Web site: www.coolgreen.co.jp
Supplier: www.willowpr.com.au **Price:** $99

atomic
6.5/10

NETGEAR FS524s



It's becoming increasingly difficult to find a small business these days that isn't running a computer network. While a hub is suitable for smaller networks with little traffic, a switched network is becoming necessary as networks start to move larger amounts of traffic, as well as incorporating larger numbers of PCs into the network. The NETGEAR FS524s is a 24-port 10/100Mbps switch aimed at the higher end of the SOHO network market.

Most switches usually only have two LEDs for each port, but the FS524s has an additional activity display panel. This allows you to monitor port activity and traffic collisions with a quick glance – a handy feature for administrators. It also has the standard uplink port that can be used to patch the switch to another switch. Each port is capable of handling either 10Mb/s or 100Mb/s connections.

The most impressive feature of this switch is the high-speed stacking ports. There are two of these located on the rear of the switch, looking somewhat like an IEEE 1394 port, both with a maximum bandwidth of 2GB/s. These allow you to stack the switch without losing a port, and also make for a much speedier network, as the uplink can now run at 2GB/s as opposed to the 100MB/s that some switches are limited to. A maximum of four of these units can be stacked to provide 96 ports, without using a single front port for uplink duties.

We patched this switch into our office network and performed a brief test to check its performance. This involved pinging the crap out of multiple ports on the switch and then checking the ping time. These ping times were compared against a NETGEAR hub, which averaged 150ms for each ping. The FS524s average of 10ms shows how much faster than a hub a network switch can be.

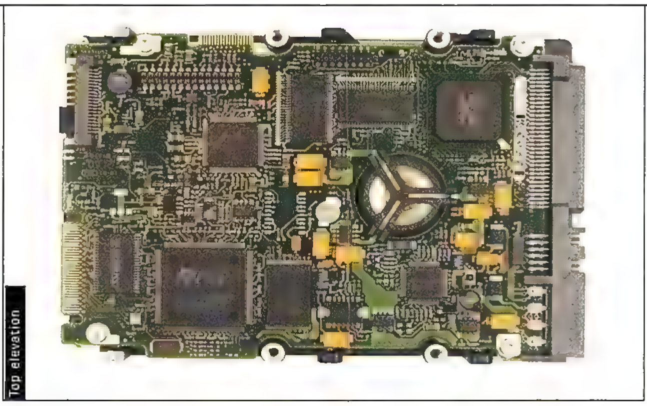
For an unmanaged switch, the FS524s is an easy-to-install, high-speed network solution, although the $2,099 price tag might make it a little pricey for those who don't really need all that network connectivity. But if your network is starting to get the chug blues or you need more available ports, this device will serve your needs well. ▢

SPECIFICATIONS

10/100Mbps, 24 ports, two 2GB stacking ports, activity display panel
Web site: www.netgear.com.au
Supplier: www.netgear.com.au **Price:** $2,099

atomic
8.5/10

Barracuda IV ST380021A



The Barracuda IV is the latest in Seagate's successful product line-up, with more than a few new features to entice your upgrade bucks. The highlight is its noise level or, more specifically, lack of. Seagate hard drives of the past have been renowned for being noisy critters, but the Barracuda IV, using a 'fourth-generation fluid dynamic bearing' courtesy of the SoftSonic motor, promises to be totally silent. And it is just that.

Another innovative feature is the massive 20GB platter size, which means that the 80GB drive has only four platters. This lowers the cost, keeping the 80GB version at an affordable $630. The drive spins at 7,200rpm and uses an ATA/100 interface.

We hooked the drive up to our ASUS A7V133 motherboard via the Promise Ultra DMA/100 controller, with a 1.2GHz Athlon taking care of all processing duties. ThreadMark was the first benchmark to be pulled off the file server, with the Barracuda IV posting a respectable 15.77MB/s data transfer rate. This compares favourably with our reference IBM Deskstar 75GXP drive, which posted a result of 15.63MB/s.

Then came our home-grown hard drive benchmark, copying 1GB of different files from one partition to the next. The Barracuda took 110 seconds to transfer these files, giving it a sustained transfer rate of 9.19MB/s. The IBM Deskstar took slightly longer at 125 seconds, a transfer rate of 8.08MB/s. This top-notch real-world performance approaches even that of a SCSI drive. After testing the drive, we noticed that it became almost too hot to touch, so a bay cooler could be worthwhile to help keep the temperature down.

The Barracuda IV provides excellent performance at a reasonable price, with the bonus of being totally silent. If you're looking for a new IDE drive, this is a very worthy candidate.

SPECIFICATIONS

80GB on four 20GB platters, Ultra DMA/100 interface, ultra-silent SoftSonic Motor

Web site: www.seagate.com

Supplier: www.text100.com.au **Price:** $630

atomic 9/10

Lian Li PC-31 Mini Tower

Lian Li cases are synonymous with three things: high prices, high build quality and gorgeous looks. The PC-31 reinforces this rightfully deserved reputation, at the same time as packing much more than you'd expect into such a small case.

At 21 x 37cm (W x H), this is a compact case, yet can still comfortably fit almost any full-sized ATX motherboard due to its depth of 49cm. Unfortunately, if you happen to own an older 423-pin Pentium 4 setup, this case lacks Pentium 4 heatsink mounting holes, so you'll have to look elsewhere for your designer case needs.

Somehow Lian Li has managed to jam six 3.5in and two 5.25in drive bays within this compact case, obviously utilising the same space-saving technology that Dr Who used in the construction of the TARDIS. The use of aluminium means that it's lightweight (a meagre 4,95kg), yet it still has a very solid feel to it. And, of course, all edges are rounded to stop you spilling blood into your precious components. The case has a black finish with plastic silver-coloured highlights on the front facia, but opinions are divided as to whether or not this looks good.

Lian Li cases are also renowned for their excellent cooling arrangements, and the PC-31 doesn't buck this trend. Two variable speed 80mm case fans are mounted behind the front face directly in line with the bottom interior drive bay, with the speed controllers hidden behind the front facia.

A feature that will appeal to those who like to tinker is the removable motherboard mount, which simply slides out of the rear of the case after five screws are removed. Speaking of screws, all removable pieces are mounted with thumbscrews, making a screwdriver unnecessary.

At around $300 without a PSU, this is one of the cheaper Lian Li cases available. It's still a little overpriced given its dimensions, but might entice those who want the quality and looks of a Lian Li without paying $400 or $500.

SPECIFICATIONS

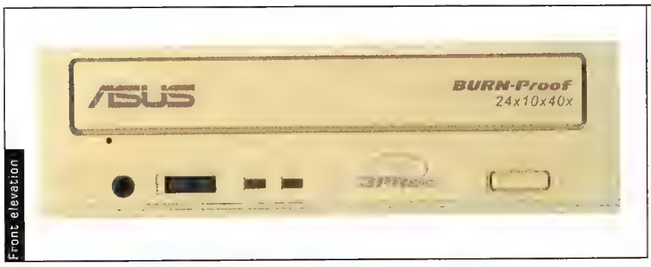
Aluminium construction. Dimensions: 21 x 37 x 49cm.
Weight: 4.95kg

Web site: www.lian-li.com

Supplier: www.anyware.com.au **Price:** $300

atomic 8/10

ASUS CRW2410S



Front elevation

The 24x CD burner explosion is well and truly underway and the latest manufacturer to jump onboard is ASUS. With its CRW2410S model, it has employed some interesting technology in the pursuit of rock-solid 24x burning.

As the first company to make it to the 16x mark, Yamaha had to employ a technique known as Partial CAV (P-CAV) in order to keep burning reliable at high speeds. The problem with fast burning is ensuring good data quality at high speeds. When drive speeds go over the 8,500rpm mark, reliability starts to drop off.

To get around this fundamental barrier, ASUS has chosen to use a new technology called Z-CLV (Zone Constant Linear Velocity). This splits the disc into three zones for the purposes of burning. For the first 14 minutes of the disc the drive burns at 16x, then it jumps to 20x for the next 10 minutes. The rest of the disc burns at 24x. What this translates to is a gradient of several main burn speeds based on the amount of data being copied. The major benefit is that the drive motor stays relatively slow, significantly improving reliability. However, small chunks of data will only burn at 16x, whereas a whole disc will burn at 24x. This is a boost over the P-CAV drives, which slowly build up to peak speed, rather than jumping between the faster speeds associated with Z-CAV.

In terms of performance the CRW2410S is a monster, with the Z-CAV technology producing impressive results in the Nero CD Speed 99 (www.cdspeed2000.com) burn tests. Data and audio transfers are undertaken using CAV technology, with an end speed of 40x and an average transfer rate of 30x.

As is becoming the norm, the drive uses BURN-Proof technology to minimise the buffer underruns that used to plague CD burning. This becomes important with the tricks used in Z-CAV burning. Overall, ASUS has combined reliable burning with some of the best write performance out there to make a very impressive CD burner. The CRW2410S is more than just a mouthful – it's a beast.

SPECIFICATIONS

24x write/10x rewrite/40x read drive, BURN-Proof, Z-CAV technology for maximum write speed, IDE interface

Web site: www.asus.com

Supplier: www.cassa.com.au **Price:** $389

atomic
8.5/10

Gyration GyroMouse Presenter

Side elevation

This device is much more than just a wireless mouse. In fact, if you want to use it solely as a desktop mouse, it's pretty darn crap. The heavy construction, combined with a very clunky ball mechanism, make it one of the more uncomfortable desktop pointing devices you could use. It doesn't even have a scroll wheel. But when you lift this thing off your mousing surface and the revolutionary gyroscope motion tracking kicks, you'll notice what makes it so special.

If you're one of those important types who regularly present PowerPoint displays via a projector, you probably use another person at the PC to control the display while you stand near the screen and do all the talking. After all, you can't really hunch down on all fours to use a mouse on the floor, and a mouse pedestal looks rather silly. Enter the GyroMouse Presenter.

When the mouse is held in the same manner as a television remote control and operated mid-air with the special Activity button on the bottom of the mouse depressed, tiny gyroscopes within the mouse spin up. Moving the mouse up, down, left and right then results in the onscreen pointer moving in the same direction. It takes a little getting used to, but it will soon become second nature. And the degree of control is surprisingly accurate considering the small space the mechanism has been crammed into. It works at a range of 60ft courtesy of the wireless radio frequency (RF) connection, but at this range you'll need a behemoth of a display to see your pointer.

The promotional information claims that this device can also be used for gaming, but a quick test found it to be next to useless for this purpose. For starters, it's not quite as accurate as a traditional mouse, and the heavy weight makes continuous use an arm-straining affair. But if you need to give a presentation via the PC while standing up, the GyroMouse Presenter is the perfect, albeit costly solution. And it utilises some nifty technology in the process.

SPECIFICATIONS

Wireless RF connection 60ft range, PS/2 and serial ports with optional USB, two rechargeable battery packs

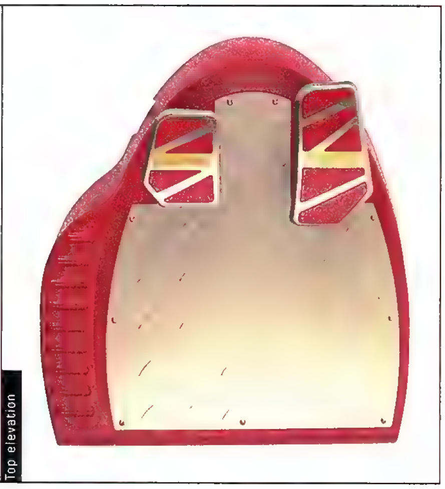
Web site: www.gyration.com

Supplier: www.electroboard.com.au **Price:** $400

atomic
8/10

Logitech MOMO Force Wheel

According to Bennett Ring, there is a God, and He made this steering wheel.



> 'Couple MOMO's real-world [racing wheel] experience with Logitech's reputation for designing gaming peripherals, and it's not hard to see why this wheel is so special.'

Every now and then along comes a product – heralded by a plethora of 'Shit yeah's!' and 'Holy crap's!' from the lucky reviewer – that makes us realise all over again why we love computer hardware. The Logitech MOMO Force Wheel fits snugly into this category of devices.

From the moment the smell of hand-stitched leather first wafts into your nose, you know that this is a high-quality product worthy of the racing gods. MOMO is a famous racing wheel manufacturer dating back to the '60s, and is renowned for the small diameter and thick grip of its wheels. Couple MOMO's real-world experience with Logitech's reputation for designing gaming peripherals, and it's not hard to see why this wheel is so special.

The MOMO Force boasts a level of comfort and control not seen before in traditional PC steering wheels. The steel gear levers are mounted within perfect reach behind the wheel, while six programmable buttons grace the face of the wheel. The end result is a wheel that looks like it's been yanked straight out of Schumacher's F1 Ferrari.

The pedals are another work of art. The sturdy aluminium baseplate construction with rubber grip pads, combined with a resistance that can only be described as podiatry heaven, means that you'll be controlling your vehicle's velocity with unprecedented accuracy. The pedals are also mounted at just the right height, using a 'dead-pedal footrest', to avoid the 'suspend your leg midair over the brake for five minutes' torture that many other pedal sets incur.

The installation of the device is hitch-free, as it uses a single USB connection. And you will never have to calibrate this steering wheel due to the wonders of all that is digital. The mounting arms work well on most surfaces, even when the underside of the desk isn't flat – thanks to Logitech's simple locking design. A drilling template and mounting bolt will satisfy those gamers who feel the need for permanency in their lives.

When it comes to force feedback, it is widely acknowledged that cogs provide a much better feel than a pulley system. So is it any surprise that the MOMO Force uses the superior cog method? The use of this technique, and no doubt much refinement of Logitech's force-feedback technology, gives the MOMO Wheel the most realistic force feedback we've had the pleasure of shaking our arms out of their sockets with. An extended period with Colin McRae 2 proved that when it's done correctly, force feedback can actually aid control as opposed to being a novelty effect used only when friends come over. Particularly notable were the different effects used, depending on the surface; gravel, for example, felt lifelike. The MOMO Force is also amazingly quiet for a force-feedback wheel, with none of the embarrassing vibrator-like noises that some others emit.

On a final note, the wheel is red. As we all know, red things go faster, so you'll be pulling off lower lap times than you ever thought possible without the use of a Batmobile booster rocket.

All of this does come at a price – 500 big ones as a matter of fact. This will probably limit the purchase of the MOMO Force to hard-core racing enthusiasts or people who tend to regularly carry $500 in small change in their wallet. Regardless of who can afford this baby, make no mistake: when it comes to steering wheels, the Logitech MOMO Force Wheel sets the benchmark that others must now aspire to.

SPECIFICATIONS

USB connection, six buttons plus two gear levers on wheel, cog-based force-feedback mechanism

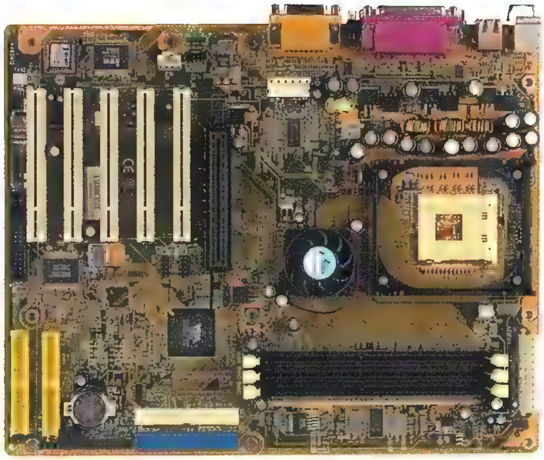
Web site: www.logitech.com

Supplier: www.logitech.com **Price:** $499

atomic
9.5/10

Shuttle Spacewalker AV40R

Ashok Zaman goes the way of the Pentium 4, via the VIA P4X266.



Top elevation

We all know that the Pentium 4 is one bandwidth-hungry processor. Up until now, the problem with providing it with this much-needed bandwidth has been the prohibitive cost of setting it up with the native RDRAM memory solution. But for those readers who may be into prohibitive costs, getting a Pentium 4 in the first place is not going to be a problem – financially, anyway. So for these people, VIA has produced the P4X266 chipset for the Intel Pentium 4. This chipset will go some way to providing the memory bandwidth needed courtesy of DDR RAM.

Producing this chipset has landed VIA into some hot water recently, consequently resulting in an escalating lawsuit with Intel. As any worthy Atomican would do, we endeavoured to sort out the issue once and for all with benchmarks, turning up results that should raise and eyebrow or two.

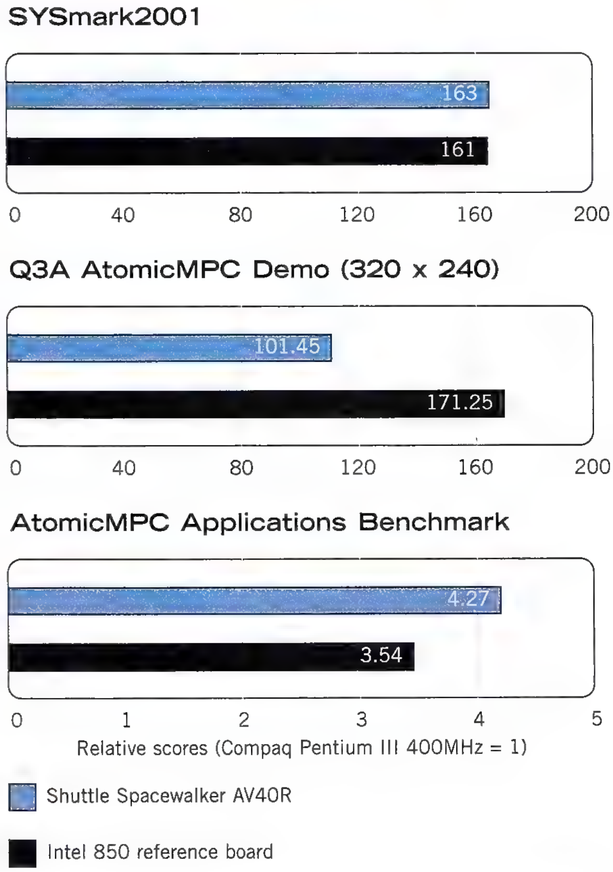
The Shuttle Spacewalker AV40R is the first motherboard we have seen to feature the VIA P4X266 chipset, built for the 478-pin Pentium 4. Three memory banks support up to 1.5GB of PC2100 DDR RAM, with CPU and FSB configuration done solely through the BIOS. This would allow for some overclocking action in the unlikely event that you stumble across an unlocked Pentium 4. Apart from the usual features, including five PCI slots and the now ubiquitous onboard AC '97 sound controller, is the Promise FastTrak IDE RAID controller. Overall, we found the AV40R to be a solid board that ran without a hitch during testing.

Set up with a 2GHz Pentium 4, 256MB of PC2100 RAM and the reference 32MB Hercules GeForce2 GTS and Ultra ATA/100 hard drive, we installed the latest VIA 4.33 '4in1' chipset drivers and DirectX 8.0 on Windows Me. We didn't use the latest NVIDIA reference graphics drivers, rather the 12.41 drivers in order to more fairly compare previous tests of the 2GHz Pentium 4 on an Intel 850 reference board with RDRAM.

First we ran BAPCo's SYSmark2001, a benchmark that Intel promotes as representative of the tasks that the Pentium 4 is designed for. The overall score was 163, and just to add some meaning to the number, the i850 RDRAM rig featuring the same device and driver setup scored 161. Not a big difference, but enough to conclude that the DDR RAM/P4X266 combo can equal, if not better, the RDRAM/i850 combo in a P4-friendly computing environment. This adds a comic tone to the legal war between Intel and VIA.

In the Quake 3: Arena AtomicMPC Demo benchmark, we saw a whopping 171.25 frames per second (fps) in the high-geometry, low-texture, 320 x 240-resolution CPU tests for the i850, compared to 101.45fps for the P4X266. Clearly, the high-bandwidth nature of Quake 3: Arena really benefits from the RDRAM solution. Synthetic results with SiSoftware's Sandra confirm the higher bandwidth throughput for the i850 RDRAM testbench when compared to the P4X266 DDR RAM testbench.

For the final piece of controversy, the old AtomicMPC Applications Benchmark was run. The i850 with 256MB of PC800 RDRAM scored 3.54, which is significantly less than the 4.27 scored with the P4X266-based Spacewalker AV40R. If I was to buy a Pentium 4, I know what I would choose.



SYSmark2001

Q3A AtomicMPC Demo (320 x 240)

AtomicMPC Applications Benchmark

Relative scores (Compaq Pentium III 400MHz = 1)

SPECIFICATIONS

Socket 478 , VIA P4X266 chipset, DDR RAM support, three DDR DIMM slots (maximum 1.5GB RAM), IDE RAID

Web site: www.spacewalker.com

Supplier: Sato Technology (03) 9899 6333 **Price:** $318

atomic
9/10

06
CRAYCON

People are overrated

John Gillooly wonders whether the time spent developing multiplayer modes that no-one plays is worth the effort.

Over the past few years the inclusion of multiplayer options in a game has been seen as almost mandatory. In that time a countless number of good, bad and indifferent games have been released, yet few have succeeded in delivering more than a support base of two Uzbekistani servers running from 33.6K modems. On the other hand, do an update using GameSpy on Counter-Strike servers and you will wait at least half-an-hour before it completes.

Apart from the moderately populated RPG genre, most other genres have only a handful of titles that are being played online. A prime example is real-time strategy (RTS), which has spat out record numbers of mindless repeats on the same theme over the years, interspersed with some kick-butt titles. Despite this, the online community clusters around a few good but generally quite old titles like Starcraft.

In the popular first person shooter (FPS) scene the level of support for new games is abysmal, unless id Software or Valve are involved. Just look at the recently released Return to Castle Wolfenstein multiplayer test, which contains one level of Normandy beach storming action. Run a server refresh on it and you will find dozens of Australian servers, all full of people playing the same map again and again in some kind of weird *Groundhog Day* meets *Saving Private Ryan* fusion.

Then look at the Red Faction multiplayer demo, which was released a couple of days before Wolfenstein. Refresh those servers and you get a total of about 12 – worldwide.

The strange thing is, the multiplayer gameplay in Red Faction is pretty bloody good. There are obvious problems, like a marked difference in skill levels leading to some brutal games and only four maps (which is still three more than Wolfenstein). But once you get past them you'll find a fun and slightly different take on the online shooter. Couple this with the potential of the Geomod engine to add something above and beyond the standard Quake engine backbone that underlies most of the popular online shooters, and you get a game that by all rights should bloom online, but probably never will.

Other interesting takes in the genre met similar fates, like No One Lives Forever, which used a host of funky weapons and vehicles, and good level design to produce some magic multiplayer moments. The list of games that had good multiplayer modes but never achieved widespread popularity is littered with such titles, and it is unfortunate that it will have to take something truly stunning to break the spell the current faves have over game players.

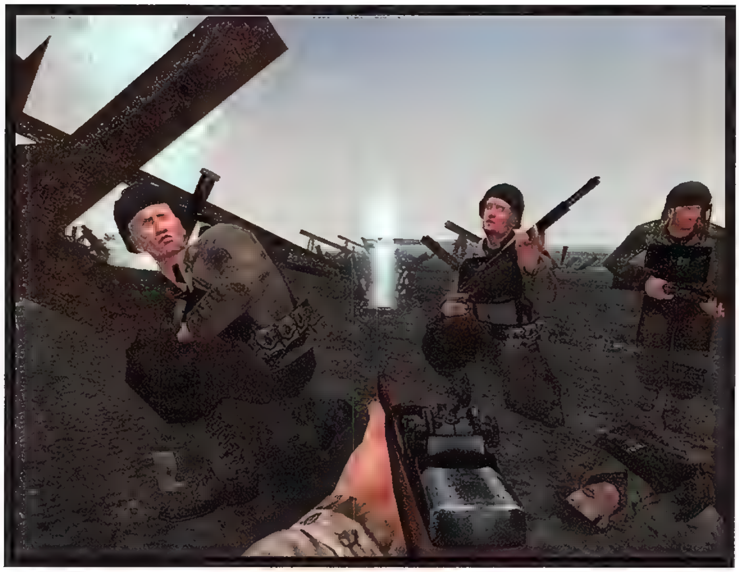
As development time continues to spiral, it seems appropriate to take a good look at why we need every single new title to be multiplayable. I, like many, still prefer a solid single-player game over a compromise between single and multiplayer. id Software has taken an interesting step with Return to Castle Wolfenstein by essentially running two different development teams: Grey Matter Interactive to develop the single-player game and new id Nerve software for the multiplayer portion.

This means proper focus can be given to each game style and that the game can be completed on a realistic time scale; this in turn should lead to a very solid game. That is not to say that developers should all adopt this model, but there needs to be some thought put into whether or not they can offer something new or different. And that does not mean creating a bog-standard Capture the Flag mode, calling it FiFiMatch and using a small stuffed poodle instead of a flag. It means serious consideration must be given to whether or not multiplay fits the theme and actually gives us a reason to turn away from the current games that we know and love.

There is still nothing quite like laying the smack down as a new multiplayer game, but there are only so many ways you can do it at the moment, and a single-player game that holds the grip for weeks or months on end is much, much better than a multiplayer game that dies after a day or two.

Medal Of Honor: Allied Assault

George ‘blood and guts’ Soropos previews one of the most exciting new games on the horizon.



The now famous beach assault is one of many amazing missions in MEDAL OF HONOR.

> ‘We were lucky enough to get a build to play; an early build, but one that was complete enough to let us know this game will be something special.’

Years ago, when the editor of an Australian PC games publication asked his contributors to volunteer a list of their top five games of the year, someone had the cheek to suggest a PlayStation game called Medal of Honor.

A taut, tense first person action title, Medal of Honor showed again how a great game design and concept can override the belief that you need to have the latest, greatest hardware to play the best games. It also proved the worth of the WWII battle era as a viable commercial risk for game publishers. As a result PC gamers will soon be able to play their part in the campaign for Western Europe in a brilliantly realised game world that hasn’t been exclusively tied to the Xbox or compromised for release on a next-generation console system with 16MB of RAM.

There are already a million previews on the Net and in print for Medal of Honor. Go to the official site at www.mohaa.com or read any of the countless online previews to find out that Medal of Honor has over 20 different enemies, 24 levels of gameplay and that the facial expressions of the soldiers were motion-captured using a spy cam in Spielberg’s bathroom. However, if you’re a fan you’ve probably already been there. The site that is, not Spielberg’s bathroom.

We were lucky enough to get a build to play; an early build, but one that was complete enough to let us know this game will be something special. Medal of Honor’s visual splendour is easy to see; however, what doesn’t come across in the screen shots is the epic scope and feel of some of the operations.

When you’re standing in your LST waiting to land on Omaha Beach the sight of all the other landing craft heading for the coastline is quite awesome, and while the landing itself isn’t quite as spectacular as Spielberg’s film it comes pretty close. Our build did not have the multiplayer functions activated, but if that aspect of the game is finished with the same panache as the rest of the game then the potential fun to be had in such battles is obvious.

Medal of Honor also boasts a wide variety of mission types. As in the PSX versions, the player can change clothes to infiltrate German bases and installations and use silenced weapons for covert operations – and for the first time make use of vehicles as well. One mission series has you sneaking up on a King Tiger tank crew at night, taking the tank and using it to capture and hold an important bridge at Remagen as part of Operation Market Garden (as seen in *A Bridge Too Far* and *A Bridge at Remagen*).

The Quake 3 engine has proven its worth again as the framework for Medal of Honor. Forget the brightly coloured, super-slick Quake 3 of old; Medal of Honor’s developers have made the streets of occupied France and an almost defeated Germany look live. Textures are superb and the depth and attention to detail of the levels will become the envy of level editors everywhere. The character models are some of the best yet seen and below the surface the AI controlling those models is arguably the best yet, though there is still a lot of work to do on this build.

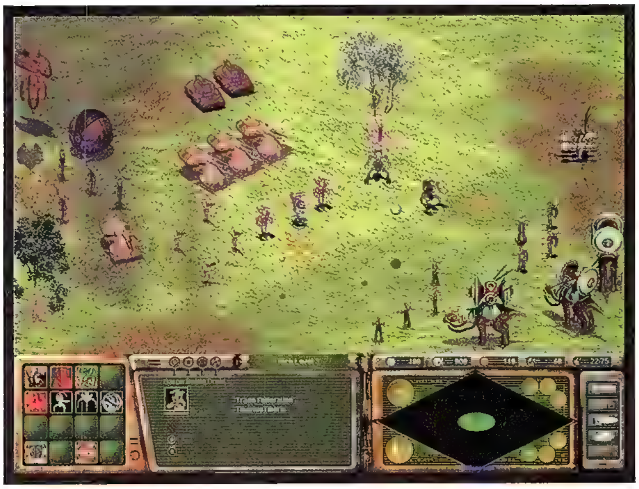
An obvious comparison is made with Return to Wolfenstein as the era and subject matter are similar. However, the two titles are quite different; Wolfenstein is the Serious Sam to Medal of Honor’s Counter-Strike, though both titles still have a lot of development to do and things can change.

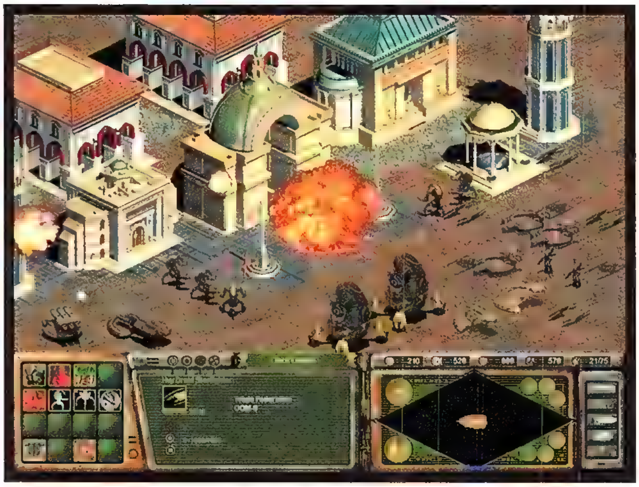
GAME DETAILS

DATE DUE: March 2002
DEVELOPER: **Dreamworks** www.dreamworks.com
PUBLISHER: **Electronic Arts** www.ea.com
DISTRIBUTOR: **Electronic Arts** www.ea.com

Star Wars: Galactic Battlegrounds

George Soropos played around with the beta and found that Lucas has seen the light.





ⓘ Age of Star Wars Empires: Droid Quest

After LucasArts' first attempt at real-time strategy went the way of the Empire in *Episode 6* (that is, crashed and burned), the powers that be decided they would make their next attempt with a tried-and-true formula. Say goodbye to heavily scripted missions, the 'bull by the nose' design mentality and an inferior 3D game engine and say hello to Age of Empires II (AOE).

Playing the E3 Demo mission – the only one that would work in our build of Battlegrounds – you are instantly reminded of Microsoft's classic RTS title, but not to the point of distraction. Battlegrounds' interface is similar enough for AOE II players to jump straight in, but there are a few welcome tweaks. It's now easier to find idle workers thanks to a new blinking icon and each culture has a very unique architectural style.

Of course, there are many similarities as well: each race has a special unit such as the Empire's Dark Troopers, there are four resources to manage (carbon, nova crystals, metal and food) and the upgrading of buildings is an integral part of developing your forces. The game also includes a map, campaign and sprite editor, which allows you to continue the adventure indefinitely.

The single-player campaign aspect of Galactic Battlegrounds is generous, with six campaigns that allow you to conquer or liberate Naboo or the Gungans as the Trade Federation; hunt down the last of the Emperial forces and take control of the Wookies as Han and Chewbacca; organise the final onslaught on Death Star II as Leia and the Rebels; or hunt down the Rebels before they can strike as Darth Vader and his Imperial forces. In other words, everyone gets a guernsey except the Ewoks, who you get to use as target practice in the training missions.

The in-game events cover about 75 years of Star Wars history but, regardless of what you might have read elsewhere, that doesn't include any sneak peaks at *Episodes 2* or *3*. The campaigns are strategically arranged around that as yet unknown period.

There are heaps of unit types in the game, which has necessitated the invention of a whole host of new Star Wars gadgets and vehicles, as well as the fleshing out of organisations like the Trade Federation and the Gungan race. In fact, many fans will probably spend the first hour or so with the game looking up the entries in the excellent built-in database. Galactic Battlegrounds doesn't hold back on multiplayer features either, with seven different game types for online or skirmish play including old AOE favourites like Monument Race and new modes like Commander of the Base.

Surprisingly, playing Galactic Battlegrounds is a bit like playing AOE II. The AI has been tweaked, so some of your old tactics may not work (though some will). For AOE players the trick is to learn the strengths and weaknesses of the new units and how best to use them; for everyone else, getting a feel for AOE II now will definitely help if you want to be competitive online.

After the embarrassment of Force Commander, LucasArts had to put its next RTS foot forward very carefully and conservatively. The choice of the AOE II engine suits the concept and solidly grounds the game. It seems that only European developers know how to make 3D RTS work well and it was a good idea for LucasArts not to push its luck.

GAME DETAILS

DATE DUE: March 2002
DEVELOPER: 2015 www.2015.com
PUBLISHER: LucasArts www.lucasarts.com
DISTRIBUTOR: Electronic Arts www.ea.com

Red Faction

John Gillooly just keeps on looking for those damn Reds under his bed.

ⓘ One of the true standout aspects of Red Faction is the weapons dynamics. After wielding this railgun you won't want to get back to Quake 3 in a hurry.

At one point or another everyone has wanted to wield the ubiquitous first person shooter rocket launcher and blow great gaping holes in the scenery. The worse the game is, the more you want to obliterate those angular cliffs and corridors. Welcome our saviour, Red Faction.

This latest title from Volition, the veteran developer of Descent, Freespace and Summoner, is a first person shooter set on Mars in the middle of a group of revolting miners. In addition to the battle with questionable personal hygiene, the miners are also fighting against the oppressive Ultor mine management.

Enter Parker, the mild-mannered miner whose journey through this revolution is the focus of the game. Starting deep in the mines, the battle takes you through the mines and then over land, underwater, through the air and even into orbit as you join with the shadowy rebel force, the Red Faction, in your pursuit of freedom.

On the way expect to meet the usual assortment of nasty security personnel, heavily armed mercenaries, mysterious allies, evil scientists, several bureaucrats and some weird mutant critters.

Blowin' stuff up

Perhaps the most hyped aspect of Red Faction's build-up is the new Geomod engine that underlies the game. Rather than just your average corridor and crate creator, the unique aspect of the engine is its support of malleable terrain. While the ability to blow gaping holes in the landscape is not a new concept (it was an integral part of such pioneering games as Magic Carpet), this is the first time such a complex system has been adapted to the first person shooter genre.

The engine is a wonderful sight to behold; you can watch everything from small craters through to bizarre rock sculptures using only a rocket launcher and some remote detonators being blown into the ground. Integration of this into the game, however, is slightly disappointing.

Only on very few occasions is blowing holes in stuff actually beneficial to the progress of the game itself. Mostly, it is confined to irrelevant hidden areas. Though some circumstances are certainly conducive to a bit of Geomod creativity. Rather than shoot a lever and open a bridge, it is quite possible to blast a rough rock staircase into the opposing cliff wall and then take a leap of faith.

In multiplayer, the malleable terrain is mostly found on outdoor structures or as doorways to extra base entrances. However, a canny team of flag defenders can quickly max out the engine's inbuilt limit on crater numbers by blasting away at obscure areas of rock face.

Another satisfying aspect of the engine is the bullet physics. The feel of the weapons is spot on, and there is a distinct art to aiming. This is a huge relief after the initial demo release, which was marred by inaccurate and even illogical bullet behaviour. As an added touch, some weapons such as the rocket launcher feature sensors that can pick up heat signatures through walls and display them on the screen. This adds another degree of strategy to the game, especially in multiplayer.

A big contributing factor to the good feel of the weapons is the sound used in the game. This is often an underrated feature, but the sound in Red Faction is certainly worth commenting on. As one of the better game soundtracks of recent times, everything from the music to the gunfire is just perfect. This combines with the weapon dynamics and the superb hit and death animations to deliver one of the most satisfying in-game bullet pumping encounters I have ever experienced.

I've fallen and I can't get up

That is not to say Red Faction is all plain sailing. Some nasty and annoying bugs spoil the game, with noticeable short periods of lockup, sound glitches and clipping issues. In fact, this is the first game in years where I have had to resort to the old save and load to get myself unstuck.

The game AI also has some strange glitches, with some of the NPC characters that have to follow you displaying worse AI than the hostages in beta one of Counter-Strike (for the non-Counter-Strikers out there, the beta one hostages were renowned for getting stuck on corners, stairs and even joins between polygons in the scenery when they finally decided to follow you). On the other hand, the enemy forces can be brutal and display a fair degree of cunning at times, especially in later levels. The combination of this with the weapons dynamics makes for some fun gunfights.

Also included in the game are a series of vehicles: airborne, ground based or submarine. The vehicle control is fluid and intuitive, and the very limited sequences of it were a load of fun. The purpose of these sequences is to break up the running and firing that comprise a large part of the gameplay in Red Faction.

The game also looks good, though it doesn't quite reach the high standards of some recent titles. Of special note, however, is the intricately distracting breaking glass featured in the game. This stands out as some of the best glass shattering ever. The different areas that Parker journeys through are also cleverly designed and beautifully textured – they just seem to lack a certain intangible something.

The engine generally runs smoothly with the graphics settings pumped right up, however, I noticed several periods in the initial phases and during multiplay where the system would lock up for 10 seconds at a time, especially when running the game under Windows 2000.

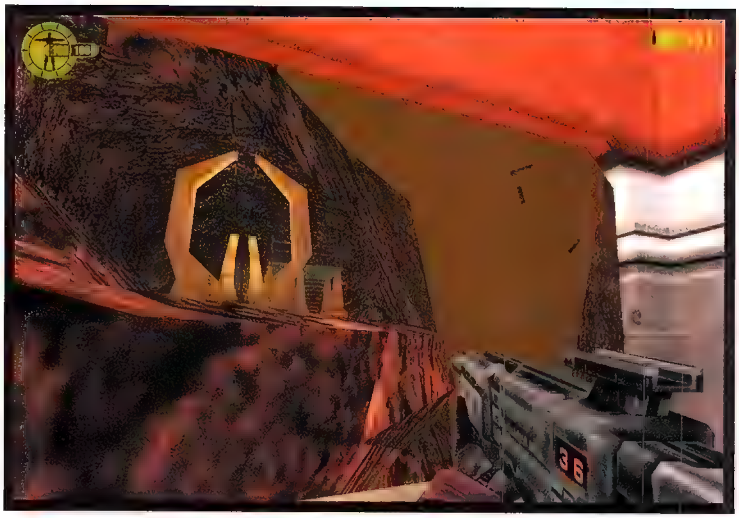
Losing the plot

Even with the positive points, the game suffers one critical problem: the story just isn't compelling enough, and the drive you need to keep playing simply is not there.

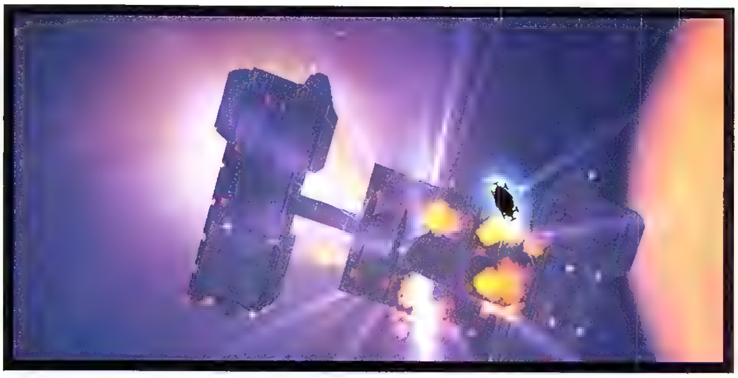
This is a huge disappointment, because the one area that some first person shooters have excelled in of late is story and playability. If we look at the standout shooters of recent years, like the now highly dated Half-Life, the fairly recent No One Lives Forever and even the spooky Gothic thriller Clive Barker's Undying, they all have story-lines that suck you, and your social life, right in. Red Faction's underlying story-line lacks this element. That isn't to say Red Faction isn't fun, it's just that it could have been a more complete game if the story had been a little more gripping.

That said, Red Faction has the potential to make inroads into the multiplayer scene, especially given the potential of the Geomod engine for mod makers. Imagine a game of Counter-Strike where you can stop the rush by digging a defensive trench; Rogue Spear where breeching charges can be used on bare walls; or using the rocket launcher to carve out a hole in a rock face to make a nice little railgun camping spot when deathmatching.

There is little doubt that Volition has delivered a solid game with Red Faction, while simultaneously announcing the arrival of a very competitive new kid on the burgeoning 3D engine block. Red Faction looks, sounds and feels fantastic, but for all of the satisfying burst fire and stunning martian vistas that you can blast to smithereens, it could do with a more complex story-line.



The game is full of nice little touches like the ammo readout on the assault rifle.



Even the Martian orbital platforms aren't safe from Parker's nasty flatulence problem.

GAME DETAILS

FOR: Great weapon dynamics, malleable terrain, amazing sound, driveable vehicles

AGAINST: Buggy, very buggy. Story definitely lacks oomph.

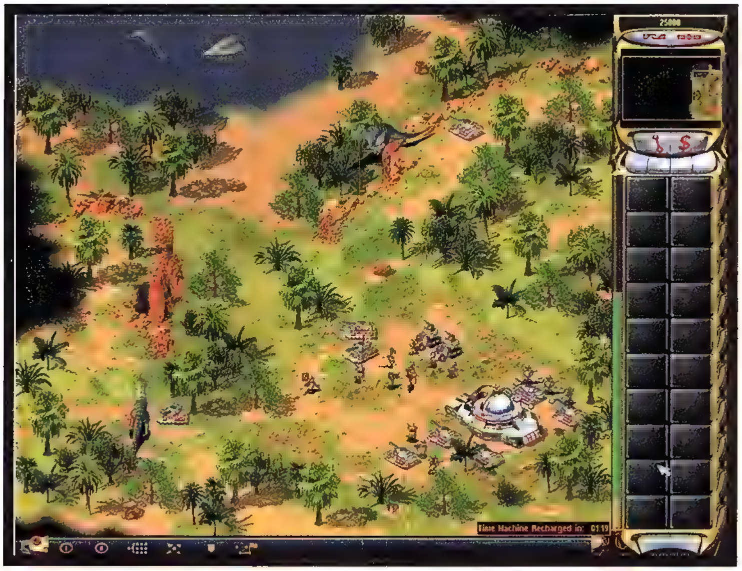
MINIMUM REQUIREMENTS: 400MHz CPU, 8MB 3D accelerator, 64MB RAM
RECOMMENDED: 600MHz CPU, 32MB 3D accelerator
SOUND APIs: DirectSound, EAX
VIDEO APIs: Direct3D

DEVELOPER: Voliton www.voliton-inc.com
PUBLISHER: THQ www.thq.com.au
DISTRIBUTOR: THQ www.thq.com.au

atomic
8/10

Red Alert 2: Yuri's Revenge

George Soropos is a closet pinko. Yuri is his hero.



ⓘ Yuri's fearsome giant lizard ferrets around the bush.

Red Alert 2 proved to be just what Westwood needed to win back its fans after the disappointing and much hyped Tiberian Sun left gamers wondering whether or not the inventors of the real-time strategy genre hadn't lost it completely.

Known to be a company that is willing to flog a good idea until it bleeds, Westwood has kept the ball rolling with the release of Red Alert: Yuri's Revenge. Contrary to popular opinion our favourite Soviet fruitcake has survived the Allied onslaught only to emerge stronger and with a number of very devious devices at his disposal.

In the single-player game you cannot, unfortunately, control Yuri's forces directly but instead use either the Allied or Soviet forces to fight back against him in two separate campaigns. A key difference between Yuri's Revenge and the earlier Red Alert 2 (or any other Westwood RTS title for that matter) is the designer's use of some very heavily scripted missions.

Don't panic, this isn't Force Commander from LucasArts. The missions in question are a lot of fun to play, and the heavy scripting makes the story-line a bigger part of the game and provides players with more of a challenge than simply 'build the base and blow up the enemy'. Of course, for players who like to build those whopping planetary collision-proof bases, there are also quite a few of those kinds of missions.

The game incorporates time travel in an interesting way, and as part of the story you'll get to relive some of the original missions from the first Red Alert, but from a different perspective. You also get a trip to the 'Moon', which poses some interesting problems. The Moon has no resources, for example, and you can only use what you take with you. Your soldiers are also affected: no air, no soldiers! Only one type of space-suited infantryman is available.

From a multiplayer perspective much of Yuri's Revenge will obviously be familiar to anyone who has played the original game, except for the new units. Yuri has a mass of them but the Soviet and Allied forces get some too.

The Soviets finally have their own version of Tania in the form of Boris, whose special ability is to call in an air strike (regardless of whether or not you have any air units). A favourite among the new Soviet forces is the flying artillery, a long-range gun with a helicopter built around it. They are fantastic area denial weapons; just build four or five and fly them to a strategic hilltop. When the enemy land each will deploy its gun and rain death upon your foes.

Yuri, of course, has the most new units and buildings. Perhaps Yuri's most annoying new weapons are his psychic towers that perform the same function as the old Yuri troops, but can take over multiple units at a time. They are mongrels to get past or even near. Yuri also has a nasty new weapon in the form of a high-tech Gatling gun. The nasty thing about it is its rate of fire, which increases the longer it fires, making it a formidable turret weapon (though it is also found on a new scout-type vehicle).

The Allies have been busy developing counter technology and one of their new units is the unmanned robot tank. Being inherently immune to psychic dominance, it is a vital part of the Allied arsenal and it is a must if you are attacking Yuri's bases. Of course, the good ol' Soviet Kirov will still do the job for the Reds.

This add-on as gives you more of the best of a great title, and then some. Old-school 2D graphics will never die! Never! ▢

atomic
8/10

GAME DETAILS

▢ **FOR:** More of the goods for Red Alert 2 fans, good new multiplayer elements

▢ **AGAINST:** Can't play as Yuri in single player!

MINIMUM REQUIREMENTS: Pentium II 300MHz, 32MB RAM, 4x CD-ROM drive, Windows 95, DX sound

RECOMMENDED: Pentium III 600MHz, 64MB RAM, 16MB graphics card
SOUND APIs: DirectX
VIDEO APIs: DirectX

DEVELOPER: Westwood Studios www.westwood.com
PUBLISHER: Electronic Arts www.ea.com
DISTRIBUTOR: Electronic Arts www.ea.com

Sudden Strike Forever

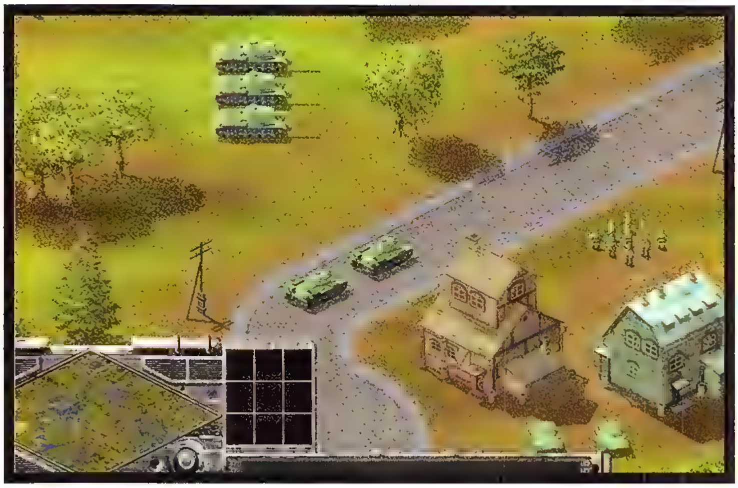
Des McNicholas strikes suddenly. Forever. Are we clear?

Released earlier this year by Fireglow and CDV Software, the original Sudden Strike drew some mixed reactions from the RTS community. Some saw it as simply the traditional RTS format with a new setting, while others felt it had the tactical depth to match the first rate modelling of WWII equipment and landscapes. Despite a few small design flaws, Sudden Strike was the fighting RTS success story of the year, and the Sudden Strike Forever expansion pack manages to fix those problems while introducing a host of new missions, campaigns and units. The new game elements fundamentally improve the Sudden Strike experience, and while veterans will be disappointed with the lack of a skirmish mode, the overall package is worth the extra investment.

Sudden Strike Forever includes four new campaigns to round out the war, including the US in Europe; the UK in North Africa; the Germans in Russia; and the Russians in Eastern Europe. Players may be a little surprised by the small number of missions in each campaign, but they are all of the massive scale introduced in the original game. The North African campaign is a particular challenge, combining close-in street fighting with the chance to manoeuvre over wide open spaces, and placing a whole new emphasis on the effective employment of motorised infantry. Seven new single player missions are included for players with only a few hours to spare, and the simple well documented mission editor will see many more under construction by serious WWII buffs.

Three new difficulty levels make getting to grips with the game a little easier this time around, although the learning curve is still a bit steep. In addition to improved variants of existing units, several new types have been introduced, including heavy and light howitzers, mortars, charge carriers and medics. Sadly, the animated briefings are no better than the original – buggered if I know what the map graphics are all about – although the check list summaries give players enough to work with. The multiplay options have also been tweaked in the right direction, with new maps and a number of time-based configuration options that can change the feel of the game.

Sudden Strike Forever has fixed some general gameplay issues, sporting smarter pathfinding, an improved interface, and a few simple shortcuts that should have been in the original. Mine laying, bridge repair and vehicle unloading have received particular attention, and the role of officers in influencing unit performance has also been enhanced. The controls are standard RTS fare, with units grouped easily via keystrokes and a very simple menu panel that allows intimate control when needed. It works well enough despite the large variety of units, although the AI's choices on initial deployment will frustrate some players. Fortunately, orders can be issued while paused, giving players the chance to redistribute their units before things get too exciting.



ⓘ An obvious winner emerges in the paper, scissors, rock competition.

Battles in Sudden Strike Forever are fast-paced affairs on a huge scale. Enemy troops unexpectedly appear in buildings or from under cover, and unseen weapons create havoc during the most cunning of plans. Aside from some very flimsy buildings, the weapon effects are fairly realistic, and players will have to think carefully about where and when they expose their forces.

Understanding the broad characteristics of the various unit types is one of the keys to victory, as are sound reconnaissance, and the effective use of air and artillery support. Nasty things start to happen over long ranges, so uncoordinated attacks and poorly supported frontal assaults are doomed to fail, which is how we like it. That said, Fireglow has done a terrific job of capturing the mayhem of close combat, and the uncertainty that sets in once in battle.

GAME DETAILS

FOR: Great mix of real-time fun and genuine tactical challenges. Looks and sounds great.

AGAINST: No mission editor, very average briefings, and poor initial unit placement.

MINIMUM REQUIREMENTS: 200MHz Pentium, 32MB RAM, 4MB 3D card
RECOMMENDED: Pentium 233MHz, 32MB RAM, 150MB HDD, 16MB 3D card
SOUND APIs: Direct Sound
VIDEO APIs: Direct 3D

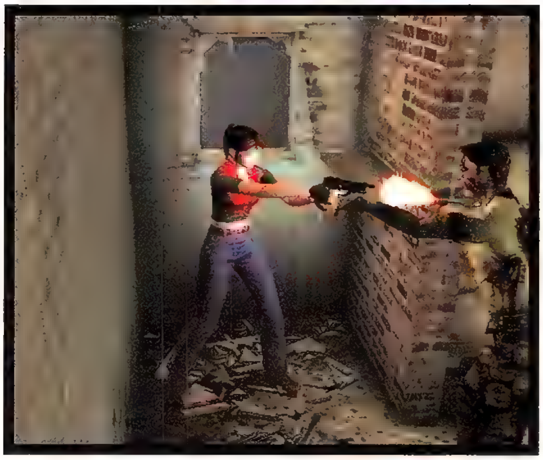
DEVELOPER: Fireglow www.fireglow.com
PUBLISHER: Strategy First www.strategyfirst.com
DISTRIBUTOR: Quality Value Software www.qvs.com.au

atomic
8/10

Resident Evil CODE: Veronica X

atomic HOT

Bennett Ring does a little dance with some old undead pals.



A woman with a big gun shooting a zombie – what more could you ask for?

The two words 'Resident Evil' are enough to send chills down the spine of many a hardened gamer. Released over five years ago to worldwide acclaim, this type of game has spawned a whole new genre known as 'survival horror'. Capcom has proven that it is the master of the genre, and Resident Evil CODE: Veronica X is a prime example of why.

The gameplay mechanics haven't changed a great deal since the first Resident Evil game, but there is one enhancement that is immediately noticeable: the pre-rendered 2D background is now fully 3D. But this doesn't mean the game has discarded the set camera angles of Resident Evil for an over-the-shoulder point of view as seen in Max Payne.

It still uses the set camera angles display system to increase the tension and suspense immeasurably, but instead of having to switch to a new camera when you move off screen, these cameras can now pan, zoom and rotate. This solves the problem of awkward camera angles, which proved to be a major hindrance when dealing with the legions of undead in the first few Resident Evil games. On very rare occasions you'll still stumble directly into the jaws of a hungry zombie as you round a corner, but these moments are so few and far between that it's no longer a problem.

You'd expect this move to 3D to come at the cost of the beautiful and detailed backdrops that the old pre-rendered backgrounds provided, but the power of the PS2 saves the day, with the environments looking every bit as good as their old 2D counterparts. In fact, they actually look better, with added depth that can't be duplicated using the old 2D method. Some of the levels do seem a little foggy but this also adds to the tension, and what you can see is all immaculately presented. Character animation and detail is also astounding, although the blood splatter effects could have been beefed up a bit to make use of the PS2's advanced particle effects. Speaking of blood, this game has it in bucket loads, giving a whole new meaning to the word gore.

The graphics are matched, if not exceeded, by the game's sound effects and music. The sound in the Resident Evil series has always been a strong tool for creating suspense, and Veronica is no exception. From the gurgling of decaying zombies to the unearthly howl of an unseen creature, the sound effects on their own are enough to bring on the brown trouser brigade. The music sounds as if it's been plucked straight from a horror movie, and serves as a warning for any impending target practice. If the music suddenly quickens and becomes dramatic, you know that you're about to enter a world of pain.

Veronica is easily the largest of the Resident Evil series, which will please some but deter others. Impatient types find the Resident Evil games to be a little slow paced already, and will no doubt find that the huge levels make things even more tedious in Veronica. But if you like this pace, the size and number of different areas will keep you exploring for weeks.

A final note about the story-line within Veronica – it is definitely adults only. In fact, it's the most adult-oriented Resident Evil yet, with the most deranged and sickening CGI and in-game sequences this reviewer has ever seen. Which can only be a good thing.

While some people won't appreciate the slower pace of gameplay that all Resident Evil games offer, those who are fans of the series will soon realise that this game is the pinnacle of survival horror.

atomic
9/10

GAME DETAILS

FOR: Amazing 3D visuals, zombies, massive levels, zombies, gripping and horrific story-line, more zombies

AGAINST: The style of gameplay won't appeal to everyone, recurring and horrific nightmares after extended periods of play

MINIMUM REQUIREMENTS: Analog controller
RECOMMENDED: Memory card, 12-pack of nappies

DEVELOPER: Capcom www.capcom.com
PUBLISHER: Capcom www.capcom.com
DISTRIBUTOR: THQ www.thq.com

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GODGAMES
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2
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Silo No.
2
ssile silo must
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and blast door
secured prior to
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DUKE NUKEM
FOREVER

I have a nasty rash on my BIOS . . .

Take another journey into the murky but enjoyable world of other people's problems with support guy Dan Rutter. If you are one of these troubled souls, then never fear – your questions are answerable. You may even win a great prize like the ultra-cool Lian-Li PC31 case from Anyware (www.anyware.com.au) that is winging its way to this month's Letter of the Month author.

Invisible drive

i When I added a new Ricoh 12x/10x/32x IDE CD burner to my PC (based on an ASUS A7V-E motherboard with an 800MHz Duron CPU), no information about it showed up. All I got was this message: 'IDE Secondary: None'. I checked that the jumper at the back of the burner was set to slave and that all the cables were plugged in. So I decided to take it back to the shop I bought it from to check if the burner was broken in any way, but they stuck it on their PC and it worked fine. I have looked at some forums, but none had anything about this problem, so could you please help me?

Steven Xue

o Assuming the drive is correctly connected, your problem is probably caused by that particular drive 'location' being hard-set to None in your BIOS setup. Many normal dual IDE connector motherboards come with up to three of their four possible IDE drive locations disabled, in the name of faster boot times.

Press Delete at the beginning of the boot process to get into the BIOS setup program (some brand-name PCs use a different key, but most motherboards use Delete). In the Main menu that appears when the setup program starts, make sure all four IDE locations are set to Auto, not None. Go into the submenu for each one and check, as some BIOSes aren't as obvious about this as they should be.

If, say, Secondary Slave is set to Auto and there's no actual secondary slave drive, it just means the computer will take a few more seconds to boot, as it looks for a drive where one isn't to be found. But if some location is set to None, then the computer won't look for a drive there at all.

Toasty T-Bird

How to lose your Net access

i I am normally a Telstra BigPond Cable user, but Telstra cut off my Internet access because it said I was running a mail server. After many phone calls and faxes, Telstra's security department outlined a problem it has experienced with some users connected to the Net with port 25 (mail server) open. This has allowed spammers access to the server, which they have flooded with spam. I have been advised to close port 25 and give them a guarantee that it will remain closed before they will reconnect me.

They obviously assume that all users of the Telstra network are fully conversant with all aspects of computing, as they have provided no instructions about how to do this. Could you please advise me of the best procedure for ensuring port 25 is blocked, and how I might prove this to Telstra when it is done. The last thing I want is to be in any way responsible for allowing hackers free reign!

David Graham-Eagle

o The only way in which having TCP port 25 open would be a problem is if you were running mail server software. The port can be thought of as, say, the door to one flat in an apartment block. Burglary is only a risk if there's actually stuff to steal in that particular flat. If nobody lives there, nothing can be stolen, whether the door is left locked or not. Allowing people to query port 25 on a computer that's not running a mail server will do nothing. It doesn't magically cause a mail server to appear.

If you are running a mail server, though, things are different. The default configuration for some mail servers allows them to work as an 'open relay'. When you're running an open relay, anybody on the Internet who knows your IP address – and spammers scan ranges of IP addresses all the time looking for open relays – can just log in to your computer and send mail to anybody, from anybody, at least as far as the mail headers go. The amount of mail they can send is only limited by the speed of your computer and the speed of your Internet connection.

When a professional spammer does this to someone who is running an open server by accident, an avalanche of complaint mail from recipients will go to the server operator's ISP, and their account will generally be summarily pulled. This is what seems to have happened to you.

You don't mention what version of Windows you're running, and you don't mention having more than one computer connected to the Internet, so I presume you haven't been fooling around with Linux. There are many mail server packages for Windows. Most Windows mail servers do not, by default, act as an open relay, but some still do.

You don't have to have an open server to get booted off BigPond Cable, though; running any kind of server, no matter how well secured, is technically a violation of the Acceptable Use Policy (www.bigpond.com/broadband/support/aup.asp).

Not that Telstra is likely to know or care, if whatever server you run results in little data being shifted around.

Gone, all gone

I just took my computer in to upgrade the motherboard. When I got the PC home, all my programs had been deleted from the hard drive, leaving me only with a new version of Windows. When I rang to find out what had happened, they replied that they had to do this because of an incompatibility between the chipsets. They didn't back up, and everything is now gone. Are they telling the truth or was I ripped off?

Is this going to happen if, for example, I get an Athlon CPU and motherboard in the future?

David McMahon

A new motherboard shifts a lot of low-level stuff around, not to mention changing the basic system drivers that need to be installed, so you usually have to reinstall Windows to make it work. It may be possible to reinstall Windows over the top of itself after a motherboard change, but doing that may also leave you with a messed up system.

If someone who is installing a new motherboard decides to format the PC's hard drive before they reinstall Windows, then, yes, all of the data on that drive will be gone. But if they just nuke the Windows directory and then install the operating system again, then your files are still all there (by default, your applications will still reside in the directory C:\Program Files), but Windows doesn't know anything at all about them.

In a situation like this, a fair few programs will keep all of your old settings if you just reinstall them again. Alternatively, you can back up the program directories, do a clean install of your applications, then restore the program directories back on top of the new installs.

Of course, there's no drama here anyway, because you backed up your data, didn't you? Everybody knows that data you haven't backed up is data that you don't want to keep, after all.

So you can just restore your data, and be in business once more.

Current model ThermoSonic ThermoEngine CPU coolers come standard with a high speed Y.S. Tech fan, and work about as well as any air cooler you can buy.

Hot processors

I'm currently running a 1.2GHz Athlon T-Bird with a ThermoEngine cooler on an ASUS A7V133 board. What's the problem, I hear you ask? Using the ASUS Probe utility my CPU is registering temperatures of between 52°C and 58°C. I currently have a front intake fan and a rear exhaust fan, both of which are 80mm and operate at approximately 6000rpm. What can I do?

Simon Crow

Well, you can stop worrying if the computer doesn't hang all the time.

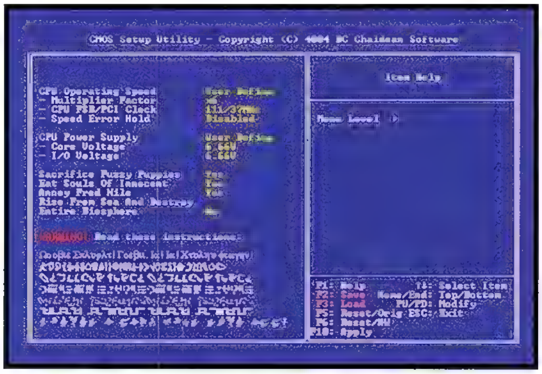
If it does, then you've got a problem, and heat may well be it. If it always takes a little while before the computer crashes, and then it does it over and over, or if it does it more often in hot weather, then heat's probably the culprit.

Take the lid off the computer and point a desk fan at the motherboard to see if the problem goes away. If so, then more ventilation and/or a better cooler is not a bad idea. Or you can just leave the desk fan there all day.

But a 1.2GHz Athlon is a warm CPU even with a decent cooler on it. The older standard-model ThermoEngine, with its low-profile stock fan isn't a particularly amazing cooler, and so a high-ish CPU temperature is to be expected. If you have the newer kind of ThermoEngine, which comes with a high-power, full-height fan (or if you've got an older one with a big fan retrofitted to it), then you won't be able to get a much better air cooler at any price. Switching from the stock thermal gum on the base of the ThermoEngine to a super-thin layer of thermal grease might still help a bit.

Your motherboard thermal sensor isn't telling you what the temperature of the core is, anyway. You don't know anything much about the heat path from the core to the probe in the middle of the CPU socket. The calibration of the sensor monitor hardware is another unknown factor; just because your monitoring software says '55°C' doesn't mean

▷



```
CMOS Setup Utility - Copyright (C) 4004 BC Chaldean Software

CPU Operating Speed              User Define          Item Help
- Multiplier Factor              6x
- CPU FSB/PCI Clock              111/37MHz            Menu Level  ▶
- Speed Error Hold               Disabled

CPU Power Supply                 User Define
- Core Voltage                   6.66V
- I/O Voltage                    6.66V

Sacrifice Fuzzy Puppies          Yes
Eat Souls Of Innocent            Yes
Annoy Fred Nile                  Yes
Rise From Sea And Destroy
Entire Biosphere                 No

WARNING! Read these instructions:

                                  F1: Help        ↑↓: Select Item
                                  F2: Save  Home/End: Top/Bottom
                                  F3: Load     PU/PD: Modify
                                  F5: Reset/Orig ESC: Exit
                                  F6: Reset/HW
                                  F10: Apply
```

The range of configuration options available in modern BIOSes is incredibly far reaching.

that's the real temperature of the sensor. It's probably accurate, but calibration can be massively off in some cases, and can change when you update your BIOS.

Back to the main point, though – if the computer doesn't hang all the time, don't worry about it.

Power problems?

I have a 1.2GHz Athlon AXIA with a GeCool GeTM2 7000rpm ORB heatsink fan, an ASUS A7A266 motherboard (BIOS version 04/30/2001), 256MB of Hyundai PC-133 SDR-SDRAM, a Seagate Barracuda 8.5GB Ultra DMA/66 hard drive, a Sound Blaster Live! Value sound card, a Creative Infra60 40x CD-ROM drive and a good 250W PSU. This PC is running the OEM full version of Windows 98 SE with all the latest drivers for everything I can think of.

Yesterday, I got rid of my Voodoo3 3000 and bought a 3D Power GeForce3 Morpheus, and installed the new 12.41 drivers for it. The CPU operates at around 50°C (give or take 5°, depending on what I'm doing). When I play some games, I get a lot of lockups, cashes and system rebooting. With some games (like the Q3A demo) it's not as bad), but with others it's every five minutes. When I'm using Word, email or I'm on the Web, everything is fine. I had the same problem with my old graphics card.

What the hell is going on with my beast? Is it just Windows being Windows or do I have static damage on the mobo? Or is it something else? Help!

Aiftura

My guess is that you need a better PSU. A cheap 300W PSU is not, necessarily, better than a good 250W unit, and neither is it likely to be up to the task of running a steaming Athlon box.

A quality 300W PSU would probably do, but you can get higher rated units for not a lot more money. Enermax and Topower make a variety of 350W and higher rated PSUs. Prices start from the $110 mark (delivered price) for the Topower PSUs, and around $150 for the Enermax PSUs.

Still chasin' Satan

In your 'Aleister Crowley computing' reply in issue 8, when you said 'But you're not ever going to get a "666MHz" bootup speed display, unless there's a "133.2MHz" FSB option for your board', you were wrong. I have an AOpen AX6BC motherboard, and you can set the bus to 148MHz and the multiplier to 4.5, which gives you 666MHz. I only have a Pentium III 450MHz, and it won't boot up to that, but a friend of mine with a 700MHz says his boots fine.

Kallus

Well, unless your friend has a non-retail manufacturing sample Pentium III, I doubt it. No retail or OEM Pentium III has an unlocked multiplier. It doesn't matter what you set in the BIOS configuration, the real multiplier stays the same. So if you asked for 4.5x 148MHz with a normal 700MHz Pentium III, you might get a bootup display that said 666MHz – that depends on how your motherboard's BIOS works – but the CPU would still be running at its stock 7x multiplier, for a core speed above 1GHz.

Getting a 48% overclock like this out of a Pentium III isn't impossible, but it's very unlikely to work with anything short of cryogenic cooling.

If your friend's CPU is actually a Pentium III 733EB, which works from 5.5x 133MHz (the 'B' in the name indicates the 133MHz FSB), then I wouldn't be surprised if it could tolerate 148MHz FSB, giving it a real core speed of just over 800MHz.

Your basic point, though, is correct. If you can get your computer running stably at 148MHz FSB, then a 4.5x multiplier will indeed give you a 666MHz core speed. On an AX6BC, 148MHz FSB is likely to be an adventure all its own, as it uses the Intel 440BX chipset and will, at that FSB, be trying to run its AGP bus 48% above rated speed. But never mind.

Finding a CPU that will run at that speed combination will be something of a challenge. The minimum multiplier for AMD Athlons and Durons is 5x, so they're out. But I suppose it depends on what the Dark Lord commands of you.

To more easily comply with the unearthly requirements of He Who Cannot Be Named, 6x 111MHz ought to be fine with any 600MHz Pentium III, and 9x 74MHz will work just as well, but that's not an elegant combination.

Why so slow?

I've got a PC with an ASUS A7V133 motherboard and a 1GHz Athlon AXIA CPU. Everything is running fine, except that whenever I try to do something it takes all of my CPU power – everything just stops and goes to the program that I'm opening. When I look at System Properties, the Performance section tells me that all of my drives are 'using MS-DOS compatibility mode file system'.

Could I have formatted my drive incorrectly? Or do I need another hard drive to fix this?

Gotek

You've probably forgotten to install the VIA chipset drivers that came with the motherboard. You can get the latest version of the VIA '4-in-1' driver package from www.viatech.com/jsp/en/dr/driver.jsp.

Microsoft mentions this in its support page at http://support.microsoft.com/support/kb/articles/Q242/6/07.asp. There are hints for resolving various other causes of the same symptoms at http://support.microsoft.com/support/kb/articles/Q130/1/79.asp.

Send your questions to io@atomicmpc.com.au or by post to:

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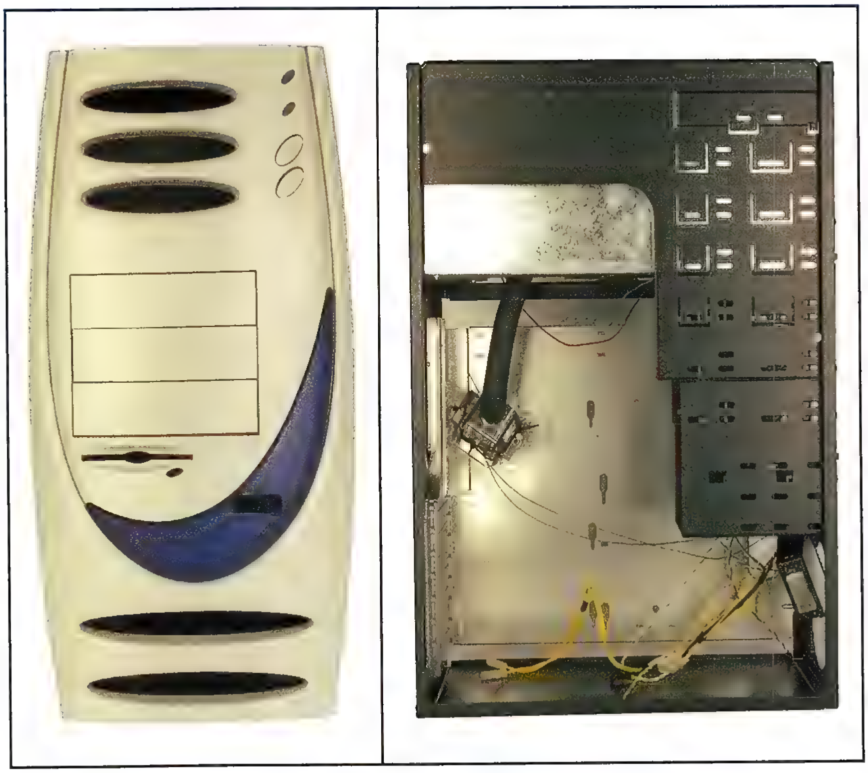
If you subscribe or renew your subscription this month, you'll also go into the draw to win a $1,900 VapoChill Socket A/Socket 370 PC case, which will lower your CPU to temperatures far below freezing point.

Unfortunately, the sweatshop we established to help subsidise the cost of Atomic subscriptions was discovered in a recent raid on the Atomic offices, so next month the price will be jacked up another ten green ones. It's still going to be great value at the new price, but why wait for the inevitable? You know what to do, so get to it!



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atomic10

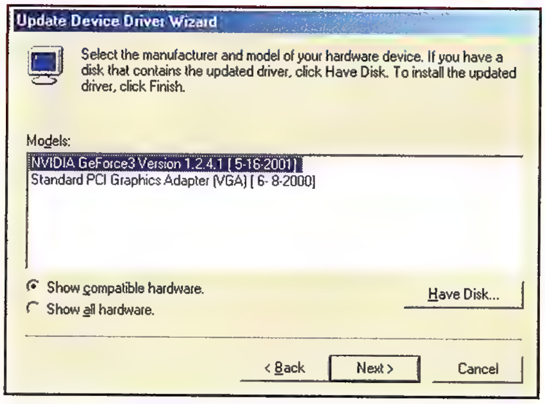
Unleash the frames

Bennett Ring shows you how to untap the full potential of your video card.

Within your PC gaming beast are two components that are instrumental in providing you with the fastest frame rates possible: the CPU and the video card. If these two important areas aren't balanced, you'll either have a PC that is great at running games at 320 x 200 resolution, or one that runs them equally badly at any resolution. This means that both of these components need to be running as quickly as possible, equating, unfortunately, to a higher cost for the average user.

Not so for the mighty overclocker that hides within every PC user, waiting for their moment to spring forth and wrench free performance from every piece of hardware in sight. We've shown you how to overclock your CPU, so now the time has come to rectify the imbalance by revealing to you the arcane knowledge of video card overclocking. But be warned: the signs of over-stressing that you encounter when overclocking the CPU aren't always obvious, so treading with caution is advised.

The results of overclocking your video card can be just as impressive as overclocking the CPU, with gains of up to 20% in frame rates. If you stick to the rules we lay out here, it needn't be a dangerous proposition, and you'll be fraggin' faster than ever as a result.


Update Device Driver Wizard

Select the manufacturer and model of your hardware device. If you have a disk that contains the updated driver, click Have Disk. To install the updated driver, click Finish.

Models:

NVIDIA GeForce3 Version 1.2.4.1 [5-16-2001]
Standard PCI Graphics Adapter (VGA) [6- 8-2000]

● Show compatible hardware.
○ Show all hardware.

This is the dialog box where you change your drivers.

Drive harder

Even before you start overclocking your video card, you could gain a significant performance increase simply by upgrading your drivers. Don't ever use the drivers that ship with your video card before checking for a more recent version online. When you do install the drivers, ensure that you uninstall your old drivers first. To do this correctly, Windows Me users should follow these steps (other versions of Windows do it slightly differently):

1. Before powering down to remove the old card, right-click on your desktop and select Properties from the drop-down menu.
2. Select the Settings tab on the top row of the Properties dialog box.
3. Click the Advanced button on the Settings panel. This will take you to the Properties dialog box for your installed video card.
4. Select the Adapter tab on the top row of this dialog, and a panel will appear displaying the current driver information. Click the 'Change...' button, and the Change Driver Wizard will appear.
5. Select the 'Specify the location of the driver (Advanced)' option, before clicking next.
6. Select the 'Display a list of all the drivers in a specific location, so you can select the driver you want' option. Click Next and a list of available drivers will be displayed. Select the 'Standard PCI Graphics Adapter (VGA)' driver, even if you're using an AGP card, before clicking Next.
7. Click the Next button to complete the installation of these drivers, rebooting your PC.

Remember how to access this list of available drivers, as you'll be coming back to it soon.

Don't be alarmed when you boot up to a low-resolution, low-colour desktop. The new drivers you have installed are the most basic set of Windows drivers, which should be compatible with almost any video card that is still widely in use.

Before you begin installing the new drivers, install the latest version of DirectX if necessary – always ensure this is up to date before installing your video card drivers. Now you have one of two options for installing your new drivers, depending on the driver package. Some drivers come as a self-installing executable file, which simply needs to be run to install your video card drivers. The other, less newbie-friendly way of installing the drivers is to extract them to their own directory, before navigating back to the driver information dialog box as described above. Instead of selecting one of the drivers listed, click the Have Disk button and browse to the directory you extracted the drivers to. Press OK and then Next to complete the installation of your new drivers. Reboot your PC and voila – you now have a clean installation of your video card drivers. Make sure you go through this process every time you change your drivers, reverting to the basic Window drivers before installing your new ones.

If you want to totally wipe the old drivers from the face of your hard drive, there are utilities available that will delete every file from the many different directories they are installed to. NVIDIA users can use a program called Detonator Destroyer, but users of other drivers will have a hard time finding anything that can do this.

Difficulty

Tweak that BIOS like it ain't no thang

Within your BIOS are several settings that can have a significant impact on your video card's performance. It must be noted that many of these settings can cause system instability if the motherboard, video card or video card drivers aren't fully compatible with the selected setting. Note that some BIOSes might use different names to refer to the settings we have set out below, so check your motherboard manual to find out the names relevant to yours:

AGP Mode

This setting determines whether your AGP port runs at 1x (264MB/s), 2x (528MB/s) or 4x (1,056MB/s). Obviously, the higher it is, the faster your frame rates will be, as the video card will be able to fetch any necessary data faster. But not all motherboards or video cards will run at the highest 4x speed. Also, many cards will not run stably at 4x until the correct drivers have been installed, so you might need to lower this to 1x or 2x until you've installed these drivers. If you set it to 4x and find that your PC won't run any 3D applications longer than 45 nanoseconds before crashing, try a lower setting to see if this improves stability. Many older motherboards require a BIOS update if they are to have any chance at running the AGP slot at 4x.

AGP Fastwrite

Surprisingly, the GeForce3 doesn't support this feature, even though it is advertised as doing so – yet another case of 'buyer beware'. If your hardware – the GeForce2, for example – is capable of running with this feature enabled, you will notice a small performance increase.

AGP Sideband Addressing

Enabling Sideband Addressing via the BIOS enables your video card to issue additional AGP requests and commands without slowing down the main address/data lines. Again, it depends on your hardware whether or not you can enable it. This setting can also be found in some video driver's Display Properties, but isn't always labelled as such. This particular setting is renowned for causing major instability with only a minor increase in performance. Anyone who has overclocked their frontside bus, and thus their AGP port, will notice this the most, as Sideband Addressing does not like to run outside of its defined limits. Enable it if you can, but you've been warned about the instability it can cause.

Graphics Aperture (or AGP) Size

This mode sets the amount of system memory (RAM) that is reserved for your video card's use. As a general rule of thumb, set this to approximately half of the total amount of memory installed in your system, although it is best to experiment with this setting to find the optimum amount for your PC.

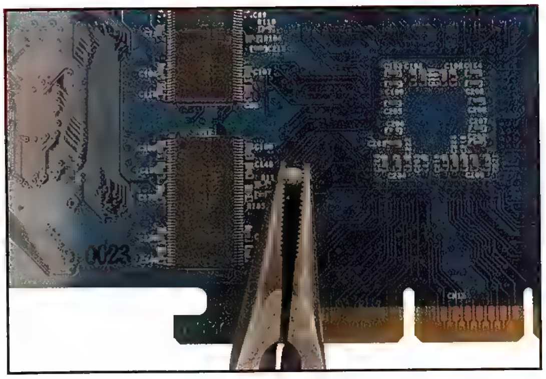
The hands-on stuff

If you're going to overclock your video card, expect a temperature increase. Most video cards already run at a significant temperature, and as a result many have a factory-fitted heatsink and fan over the main graphics processor. Some video cards also have heatsinks fitted to the RAM that is onboard the graphics card.

However, many of these fans and heatsinks are, in a word, shonky. Removing the factory-fitted heatsink often reveals a common problem; that it was not making proper contact with the chip it is meant to be cooling. So we're going to show you how to remove the main heatsink and fan in order to replace it with a beefier custom model. It must be noted that this isn't always necessary, as overclocking your video card doesn't usually involve increasing the voltage to your video card. If you do want to increase the voltage to your video card components, a hardware modification is usually required (see the GeForce3 voltage modification article in Atomic 9, page 86). Thus the temperatures won't increase quite as much as your CPU does when it's overclocked.

1. First you need to take the video card out of your PC. Let the card cool down completely before moving on to the next step.

2. If your heatsink fan is attached by small plastic pins, you'll need to flip the card over and, using needle-nosed pliers, squeeze the head of each pin inwards. It should then simply slide out of place. Some heatsink fans use a plastic screw and bolt, which is even simpler to remove. Do this for each pin; if your heatsink fan doesn't drop off you can assume the manufacturers have also used an adhesive thermal tape to help keep it in place. In this case you'll need to head on to the next steps.



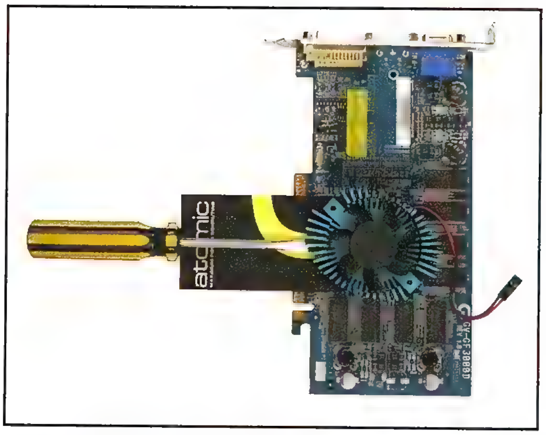
ⓘ Step 1: remove the pins that hold the heatsink in place.

3. Wrap your video card in a plastic shopping bag, squeezing as much air as possible out of the bag before tying it closed. Repeat this three times so that the video card is in a completely airtight environment. This will help to keep moisture out during the next step.

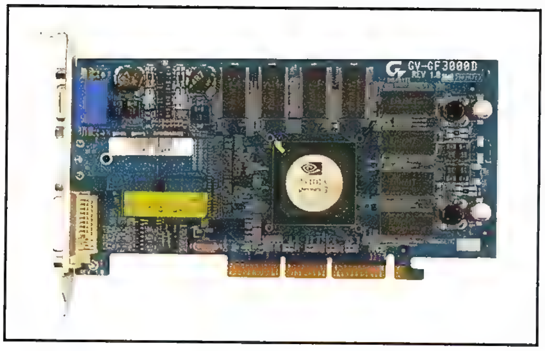
4. Throw away the 18-month-old curries in the back of your freezer, and replace them with your bagged-up video card. That's right, we want you to put your video card in the freezer – leave it for approximately 10 minutes before removing.

5. Take your silicon-flavoured Paddle Pop out of the

▷



The screwdriver is inserted between the heatsink fan and a business card.



A naked GeForce3 GPU for all the world to see.

bags as soon as you remove it from the freezer and lay it out on a clean surface. Slide a business card underneath the heatsink, and then position the head of a fairly large flathead screwdriver between the business card and the heatsink, as illustrated in the photo to the left.

6. Gently lever the screwdriver upwards. With a bit of luck your heatsink should pop cleanly off the graphics processor. By having the business card inserted between the PCB and the screwdriver, you will prevent the screwdriver from scratching the PCB. This task shouldn't require a great deal of force, so take it nice and easy. If you do need to use a lot of force, try freezing again to make the adhesive thermal compound more brittle and easier to remove.

7. As your video card warms, a small amount of condensation will form on the card. So don't even think about plugging it into your PC until this has dried *completely*.

8. Once you've removed the heatsink fan, clean the graphics processor of any remaining 'gunk'. Install your new heatsink fan using a slight coating of thermal paste if it's held in place by pins, or adhesive thermal tape if it isn't. If the original heatsink fan did not make adequate contact with the graphics processor, lapping it might be all you need to do in order to handle the increased temperatures of the overclocked card.

It's overclocking time

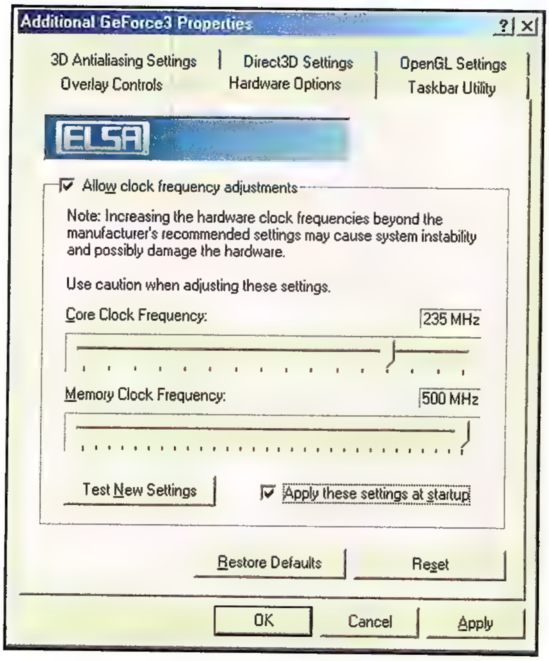
Now it's time for the fun stuff – the stage where we actually increase the speed of the video card. There are two particular video card components that will be overclocked. The first, and most noticeable, of these is the memory frequency. Increasing it will raise the fill rate of the card, making it run faster at higher resolutions and higher colour depths. The second tweak is made to the graphics processor (or core) frequency. Increasing this makes the card process the video geometry (triangles, lighting, and so on) at a faster rate, and can also help out with fill rates.

Most video cards are currently bottlenecked by their memory, so the greatest frame rate increases are achieved by overclocking the video memory, not the core. So how do you go about overclocking them?

If you're lucky, your video card drivers will incorporate overclocking features. Sometimes these features are programmed into an official driver set, but are then hidden away so that novices can't play around with them. In this case you'll need to download an additional file to activate the driver's overclocking features. The most widely known of these is the Coolbits Registry Hack, which enables the overclocking feature within certain NVIDIA drivers.

If the makers of your drivers were a bunch of dweebs who didn't want you to overclock via the drivers, there are a number of shareware and commercial applications available that will do the job just as well. The following lists which of these applications you'll need for your specific video card:

- **NVIDIA GeForce, GeForce2, GeForce2 MX, GeForce3:** Coolbits Registry Hack, NVTweak
- **3dfx Voodoo1, 2, 3, 4 and 5:** 3DFX Overclocker, Voodoo5 Frequency
- **ST Microelectronics KYRO and KYRO II:** Kyro Hard: Overclocker, Kyro Tools, Kyro2 Tweaker
- **ATI Radeon I and II:** R3DTweak, RadTweak
- **All cards:** PowerStrip ($US30 to purchase). Available as 30-day trialware.



☑ Allow clock frequency adjustments

Note: Increasing the hardware clock frequencies beyond the manufacturer's recommended settings may cause system instability and possibly damage the hardware.

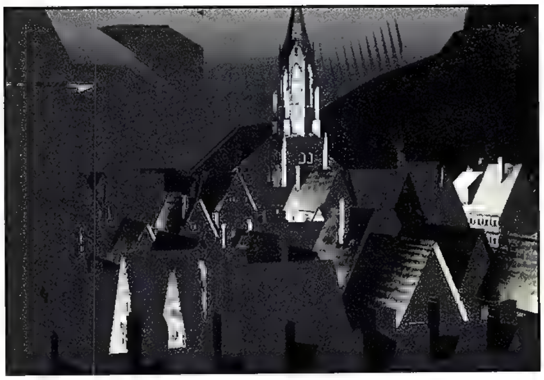
Use caution when adjusting these settings.

Core Clock Frequency: 235 MHz

Memory Clock Frequency: 500 MHz

☑ Apply these settings at startup

The NVIDIA overclocking controls after they've been enabled with Coolbits Reg Hack.



An example of artefacts caused when the card has been clocked too high.

After you've installed the overclocker-friendly drivers, a driver hack or a separate overclocking application, you'll also have to adjust two settings: memory and core frequency, which are usually represented by sliders. Some cards have both the memory and processor frequencies tied together, so you'll only have one frequency slider to adjust. Increase the memory speed frequency in 5MHz to 10MHz increments. After each increase, run a 3D application for a prolonged period.

We ran 3DMark2001 in looping demo mode for this very purpose, keeping a close eye out for any glitches. If you notice *any* distortion or artefacts onscreen you are pushing your memory too hard, and it's imperative that you *immediately* lower it to the last setting that provided a clean display. If you keep running the card for an extended period of time (longer than a few minutes) after noticing these glitches, you run the very real risk of permanently damaging your video card. Check our screen shots for types of distortion – avoid these at all costs!

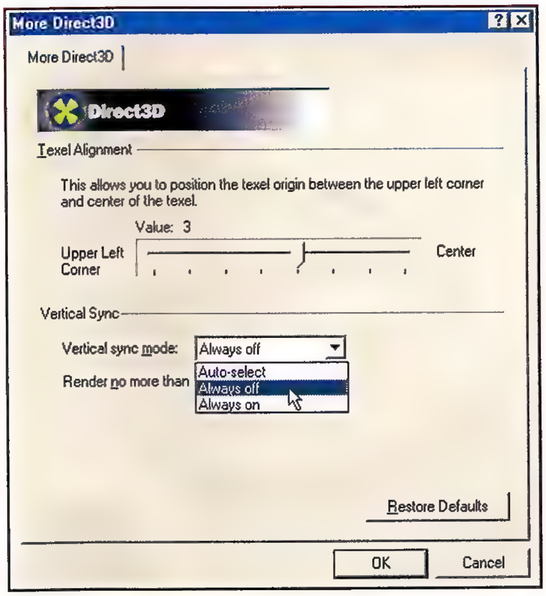
Continue increasing the memory frequency in small increments until you notice onscreen distortion or artefacts, and then lower it back to the last setting. Once you've reached the ceiling for your memory frequency, it's time to crank up the core frequency. Do this in the same manner as the memory frequency, increasing in small increments before testing it. It's sensible to benchmark your card after each small increase, because some video cards *cough, GeForce, cough* will actually slow down when the core frequency is too high. Find the maximum frequency that your core will run at, before performance begins to wane and artefacts start to appear.

Refresh rates

The refresh rate is the rate at which your monitor 'draws' or refreshes the image on your monitor. So if you have your refresh rate set to 60Hz, the monitor draws the image onscreen 60 times each second, whereas frame rate is the rate at which your video card outputs the image. Frame rates and refresh rates are quite different, in that you can still be playing a game at 30 frames per second but with a 60Hz refresh rate. Higher refresh rates lead to less eye strain, and the lowest you ever want to go is around 75Hz. Enter V-Sync.

With Vertical Sync enabled, the frame rates outputted by the video card are always limited to a factor of your selected refresh rate. This stops tearing of the onscreen image. When tearing occurs, the monitor will be supplied with two frames to draw by the video card, in the time it takes the monitor to do a single refresh. The end result is a screen refresh with a top half composed of the first frame, and the bottom of the next frame, leading to a tearing effect. Enabling V-Sync is a good thing if you are primarily concerned with visual quality, but it's an evil feature if you want to get your frame rates as high as possible.

So what do you do? You can increase the refresh rate of your monitor, via the Adaptor Properties dialog box, but the best thing to do is to disable V-Sync. This feature is usually supported by most video card drivers, but the majority of the overclocking applications mentioned earlier also have a control to deactivate it. We're not going to mention where each of these drivers/applications hide their V-Sync control, as it varies for each one, but a little digging will soon reveal it. If your video card is struggling, this simple tweak can make a huge difference.



Texel Alignment

This allows you to position the texel origin between the upper left corner and center of the texel.

Value: 3

Vertical Sync

Vertical sync mode: Always off

Disabling V-Sync can provide a quick and easy performance boost.

How high can you go?

There are two factors that most influence how far you can overclock your video card: the brand of the card and the chipset within the card. For instance, Kyro II video cards are renowned for being very poor overclockers, while most GeForce2 cards can be overclocked by at least an extra 10 to 15%.

Higher priced video cards tend to have higher speed memory mounted on them, so they are more likely to overclock better than a cheaper brand. If you're looking to overclock your new card, it might be wise to shell out a few more bucks for a better brand.

Techno tools

Daniel Rutter, like all great geeks of our time, packs a substantial toolkit. The days when a medium Phillips head are long gone. Note: there is no spanner.

If you haven't got tools – the *right* tools – then you're not a geek. Sorry. It's the truth.

Let's take it as read that you already know about screwdrivers and pliers. Even hammer technology is not beyond your ken. But here's some gear you might not have heard of, without which your PC toolbox is not complete.

01. Degaussing wand

All cathode ray tubes (CRTs), whether they're in TVs or computer monitors, are susceptible to magnetic contamination. When an unwanted magnetic field impinges on the path of the electron beams, the beams miss the phosphor dots they're meant to hit, and the result is a distorted image with odd colour blotches. The technical term for this is a 'purity problem'.

The built-in degaussing coils in TVs and monitors can deal with minor purity problems. But if some part of the monitor has been significantly magnetised, the problem won't go away unless you degauss the monitor properly.

A degaussing wand is what you use to do that. It creates a rapidly rotating, and quite strong, magnetic field. You turn it on at a distance from the monitor, move it in close and wave it around the affected area, then move it away again before you turn it off. It can take some practice to learn where and how to use the wand, but as long as you turn it on and off at a distance from the tube, you won't make a purity problem any worse.

The wand in this picture is made by Arlec (www.arlec.com.au), here in Australia. Few electronics outlets keep this tool on the shelves, but it's not difficult to have one ordered by an Arlec reseller.

02. Nibbler

A hand nibbler is a super-high-leverage punch cutter, which takes a little bite out of practically anything you can fit into its jaws. You need a hole big enough to stick the nibbler into, but it's then quite easy to nibble smooth curves and right angles. Computer steel isn't beyond a nibbler's abilities.

The nibbler pictured is the US original, made by Adel. Cheaper versions are available at various electronics and hardware stores. For example, Jaycar sells one for $22.95 (catalogue number: TH-1768); you can't replace the punch in these, but they're fine for most users.

03. Butane torch

It's useful for, um, shrinking heat-shrink tubing. And, um . . .

Okay, okay. A butane torch isn't actually a very handy thing for anything you need to do with a PC. But you still want one, don't you?

The Rekrow RK2121 torch in the picture is about the largest one you can get that runs on normal gas butane for a lighter. It will blow a 6in flame at full power and you can buy it at Dick Smith Electronics for a hair less than $80 (catalogue number: T1415).

Slightly smaller versions can be bought from almost any electronics store for $50 or so. The differences between them are purely cosmetic; they all have a gas-flow knob, an air-mix collar and Piezo push-button ignition.

There are little teeny ones that use a disposable lighter as a gas cartridge, too.

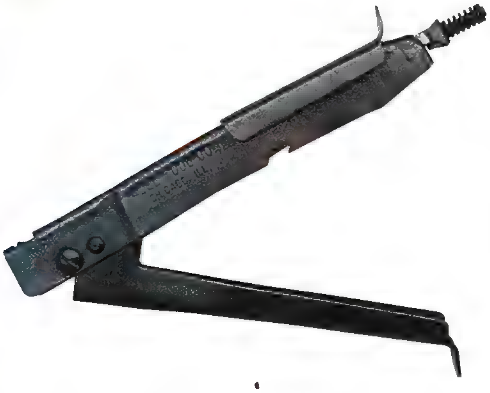
Do you need any of these? Probably not.

Are you adding a flamethrower to your shopping list right now?

Of course you are.

01

02



03

04. Dremel

If you don't have a Dremel, you're not a case modder. If you do have a Dremel and you don't use eye protection, you won't have eyes for long.

There's more than one kind of high-speed handheld rotary tool. Dremel is the market leader and makes a variety of models, including lower powered cordless models. Black & Decker and Ryobi both make Dremel equivalents for the consumer market, and there are more than a few others. If you need something with a bit more power, that will last for hundreds of hours without switch, brush or bearing failure, you don't want any of these.

You want a Foredom (www.foredom.com) flexible-shaft tool. You're looking at about $600 for one of these, though. Dremels and their other branded relatives start, in kits with a few extra bits, from less than $150.

For computer modding purposes, the most useful Dremel attachments are the abrasive cutting wheels. The super-thin emery wheels are great for shortening screws and very fine work, but they're very brittle. The big fibre-reinforced wheels, in contrast, let you use the tool as a bonsai angle grinder.

For cutting lots of steel – even the thin, mild steel of the average computer case – none of these tools is a brilliant choice. They will suffice, but you'll go through a lot of cutting wheels.

For cutting plastic or softer metals, sanding smooth the inside of a hole you've cut with a jigsaw, or putting a small, neat hole in something – or any of the thousand-and-one other household cutting, grinding and polishing tasks that the advertisements go on and on about, it's hard to beat a Dremel.

Back in the land of sanity, a pack of 25 lower quality 1.5in fibre-reinforced wheels from Widget Supply (www.widgetsupply.com) will cost you $US7.99 plus shipping. These wheels aren't rated for speeds above 15,000rpm (about half speed for mains-powered Dremels), but that's quite fast enough considering their size. Even when you include the international shipping costs, they're far cheaper than brand-name wheels.

Widget Supply has a big range of similarly cheap Dremel accessories.

05. Soldering iron

If you want to join two conductors, you can do it with a wire nut or some other splicing gizmo. Or you can just wind the wires around each other and insulate the resulting hodgepodge with vinyl tape. But if you want a proper, solid, reliable connection, you've got to solder it.

If you've never done any electronic soldering, it's easy to learn the basics. Just buy a cheap 20 or 25W iron – they're available from all electronics stores for less than $20, and a roll of resin-core solder won't cost you much more. Then practise on some scrap wire until you get the hang of it.

The iron in the picture isn't a cheapie; it's a Portasol (www.portasol.com) PSI-100K butane-powered unit. Its output power can vary from the 20 or so watts you need for fine electronic work to well over the 100W suitable for minor plumbing jobs. And it doesn't need to be plugged in, which makes it handy for use in all sorts of odd places.

You can buy butane irons from all electronics stores. Most are a lot cheaper than the PSI-100K, which sells for $159 from Dick Smith Electronics (catalogue number: T1398). All butane irons offer blowtorch-like functions that an electric iron doesn't, but most people won't need them. A cheapo mains-powered iron is perfectly adequate for the purposes of domestic wire joining.

▷

ⓘ The Dremel – buy one or it will eat you.

04

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06. Tapered reamer

Got a hole in something? Want it bigger? Don't want it too big? Use a tapered reamer.

Available from any decent hardware store, a tapered reamer lets you accurately enlarge holes in panels or pretty much any other thin surface, so you can perfectly fit that switch, light or display. Expect to pay about $20 for a good one.

07. LED flashlight

Any little torch will do when you want to see inside a PC, or into the cable jungle behind a desk. But if you want maximum geek appeal and some nifty extra features, you want an LED torch.

Although they're no more luminously efficient than a halogen bulb of similar brightness, LED flashlights work better from low batteries as they don't get yellower when their input voltage falls. They also have a long life span – tens of thousands of hours of continuous use.

In the picture below is a Technology Associates (www.techass.com) EternaLight, which has four white LEDs and uses microprocessor control to provide various dim and flash modes. These are priced from $US39.99 to $US54.99.

The black cylinder is an Arc-AAA (www.arcflashlight.com). It uses the same single AAA cell as the popular Mag-Lite Solitaire, but it's much brighter, its battery lasts longer and, so, of course, does its 'bulb'. And it's tougher, too. The Arc comes in a plethora of LED colours including white. All models except for the exotic infra-red and ultraviolet models cost $US24.95.

The teeny thing with the keyring hanging from it is a Photon Micro-Light 3 (www.photonlight.com), which is about the smallest useful light in the world. It has about the same surface area as a 20-cent piece, but is still very bright. It even has good battery life due to the tiny lithium coin cells that power it, as long as you don't mind putting up with lower brightness as the cells age. Prices start at $US11.95.

You can buy all of these lights directly from the manufacturer. Photons can also be bought locally; in Australia, they're distributed by Zen Imports (www.zenimports.com.au).

08. Multimeter

Hmm. The orange wire's meant to have 12V on it, right? Or is that the red wire? Is there any voltage there at all? Who knows?

You will, if you have a multimeter. The one pictured below is much the same as any number of cheap yum-cha meters, which sell for $20 or less from all electronics stores (battery and test leads included). They'll measure volts and amps and ohms and continuity, and these days commonly have another extra or two. For example, this one's got a temperature probe function and a simple square-wave signal generator.

You can spend a great deal more on a multimeter, but for basic computer fiddling you don't need to – a $16 one will do fine.

Of far greater value is the look of wisened professionalism a multimeter can impart to the uninitiated. Whip one of these babies out at the first sign of trouble and you will be 'pheared'.

09. Alligator forceps

Haemostats are old hat. Everybody knows about those simple 'scissor clamps' that you can get from any electronics store. They clamp down hard, they lock on, they don't cost much, they're useful.

But these are cooler.

Alligator forceps are another medical tool, which, like haemostats, are also tremendously useful for all sorts of applications that don't involve puddles of blood or a nurse outfit. Well, that doesn't necessarily involve them, anyway.

Alligator forceps have a two-piece sliding shaft that lets you open and close a small but strong pair of serrated jaws, without the shaft changing cross-section. So you can thread the shaft through a tiny gap, then firmly grab a wire, screw, dried pea in a baby's ear, or whatever, and bring it back out. You just can't do that with any other tool.

Alligator forceps are sold by medical suppliers and specialist hobby tool outlets. This one came from Widget Supply (www.widgetsupply.com), which has a good selection of haemostats and forceps, including alligator forceps with 3in to 11in reach. They're priced from $US8.99 to $US10.99.

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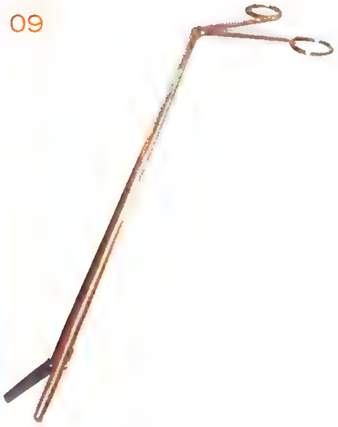


010. Screwdriver bits

Oddball screw types – tri-wing, tamperproof Torx, pin drive, square drive, Torque Set, the list goes on – are commonly used to hold together equipment that the manufacturer doesn't want you getting into.

But where's the fun in that?

Get yourself a comprehensive set of hex screwdriver bits, and you can click them into a variety of handles (or use them with a power drill, if you're feeling brutal), and be covered for a lot less money than you'd pay to buy a whole set of screwdrivers of each type.

These two sets are from Jaycar (catalogue numbers: TD2035 for the red one and TD2036 for the blue one), and they sell for $14.95 and $13.95 respectively. They've also got a monster 100-bit set now (its catalogue number is TD2038).

If you deal with a particular kind of unusual screw all the time, or if you need to reach funny screws at the bottom of wells in a product casing that a hex bit driver's too fat to fit in, then you'll need to shell out for separate drivers. Otherwise, a bit set or two will fit the bill perfectly.

011. File saw

With a drill tip and 150mm of sharp-toothed fluted body, this scary-looking implement is meant for roughing out holes in any soft material – plastic, plasterboard, wood, maybe thin aluminium too.

As a finishing cutter, it's useless. Well, unless you like your case mods on the agricultural side. But as a quick and dirty Dremel alternative for hacking a big hole in the plastic front panel of a computer, this thing'll pass. It only costs $13 from Jaycar (catalogue number: TH-2127).

Note: use of this item to disembowel people who annoy you at a LAN party is not recommended. You'll get much more satisfactory results with an ordinary carving knife.

As with just about any thin, elongated implement, the file saw also serves as a useful prodder. You know, when you need to prod some ribbon cable deep inside the case, prod the same cables securely onto the motherboard (taking care not to scratch the traces!) or anything else you feel is in need of a prod.

012. Pocketknife

It's all very well having every hand tool known to humanity sitting in your workshop at home. If you ever have to work on something when you're not at home, though, you'll need a tool that fits in your pocket. Like, duh, a pocketknife.

If you want a really versatile pocketknife that you can carry around all the time without making your pockets look as if you've been stealing the silver, it's hard to go past the Swiss Army MiniChamp II – the little one in the picture below. It's got two blades, two screwdrivers, scissors and a pen. Plus an orange peeler, tweezers and a cuticle pusher – but that last one makes a half-decent screwdriver, too. Closed, the MiniChamp II is about by 60 x 19 x 14.5mm. It retails for about $50 from camping goods places and knife specialists.

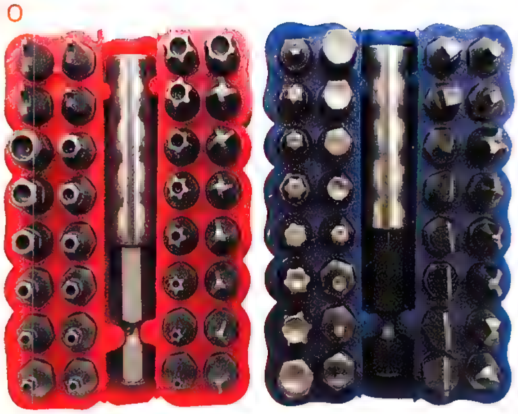
If you can put up with a bigger knife, Swiss Army also makes a selection of 'cyber-tools', like the CyberTool 41 beside the MiniChamp in the picture. Highlights of this tool include a socket driver with four double-ended bits, quite serviceable pliers and one of those weeny flathead drivers that screws into the corkscrew. It has 41 functions in all, and a cool translucent body, but it's a pretty chunky knife – and it costs the thick end of $200.

If you want something versatile that you can carry in your pocket all day, every day, the MiniChamp II is a winner.

SUPPLIERS:

Arc Flashlight, LLC (LED lights): www.arcflashlight.com
Dick Smith Electronics: www.dse.com.au
Dremel: www.dremel.com
Foredom (heavy-duty, high-speed rotary tools): www.foredom.com
Jaycar Electronics: www.jaycar.com.au
LRI (Photon Micro-Lights): www.photonlight.com
Portasol (butane soldering irons): www.portasol.com
Rekrow (butane torches): www.rekrow.ttnet.net
Technology Associates (LED lights): www.techass.com
Widget Supply (medical gizmos, Dremel attachments, and lots more): www.widgetsupply.com
Zen Imports (Australian Photon Micro-Light distributor): www.zenimports.com.au

010



011

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Word up to Big Bird

Everyone's got something to say, but sometimes there's nobody there to listen. That's so sad – but it won't be happening on these pages! Thank Anyware (www.anyware.com.au) for the funky fan prize.

Letter of the Month: It's about the music

Mark Kerr has stated the bleeding obvious rather well. We know that record company people read Atomic , so listen up! There's nothing to worry about. You too, Metallica! Relax, dudes! Wouldn't want to be a music shop owner.

Recently you featured a write-up concerning the advent of file sharing systems similar to and started by Napster. The article considered the copyright implications with the free sharing of MP3s, but this applies just as strongly to software programs.

However, your magazine as well as others that have covered this topic, seem to have neglected one small point in favour of these distribution programs: many songs, especially older ones, are either impossible to buy anymore or are extremely difficult to find.

Personally, I lost some CDs in a car during a flood. The CDs were salvaged with the car but were unusable (as was the car), and I have tried to buy copies of these CDs to no avail. Through the use of file sharing programs I have been able to get hold of at least some of the songs I have lost (and originally paid for). File sharing does have a place and, obviously, will never be stopped completely. Any programs that I download to try out of interest I will buy legal copies of if I have use for them; if not, I delete them. This is sort of a modified shareware system, and although I appreciate that most people who download software will probably not do this, I at least feel some degree of comfort myself. These days the price of software is so expensive that I feel it is better to 'try before you buy'. I will continue to download whatever music I can source, but I will also buy music CDs that I really want.

The trouble with music stores, as with all retail outlets, is that they will only sell you what they want. The advent of the paid Napster, if it comes into force, may well end the market dominance of music retailers. I will be only too happy to pay a reasonable fee to have access to music that I can download at will.

Post of the Month: Young PC enthusiasts

A warm and friendly reality check from xxman scoops POTM. We were all beginners once, and shouldn't forget it.

www.atomicmpc.com.au/forum.asp?cat=ge&top=14311

Po 'em

Something's gotten into me lately. The uncontrollable urge of downloading MP3s and constantly listening to 'In My Pocket' has driven me to the point of insanity. So how did I get rid of it? By changing the lyrics into an ode to my favourite magazine, of course.

Among the foreign magazines
I try to find you in my blue jeans
I'm drawn to your shelf (oh)
Your cover's clean as any other
I grab you like I am your lover
Grinning with pleasure
In the pages you're concealing
I'll find what I'm needing

Nothing but Atomic in my pocket
Nothing like its stickers to keep me warm
No other magazine is cheap and reliable
Tell me, how much for your love?
Only five ninety-five for your cover
All that I got to keep me warm
Baby we can't be without each other
Tell me how much for your love
(Nothing like Atomic in my pocket)
How much for your love?

The need for the next edition
Is overwhelming like a mission
Counter-Strike o' course
Throwing my computer at the wall
I consult the Holy Grail
Oh shit it's not there
It's time for a
purchase of bloody
back issue

Wormy

Numberologically

Hi, I am writing to you in reference to the ad that you had for subscriptions in your latest edition of Atomic. I am just curious about the smaller print that you had at the bottom of page 30. I noticed that it said that there would be a $10 saving if you subscribed soon, but then said that it is a saving of 0.83 cents per month. I have done the math and this actually works out to about 9.9 cents over the year. I am curious about the discrepancy. I have to admit that I am a fan of your magazine and am looking at getting a subscription, but I would like to have this issue cleared up before I commit – after all, $10 is rather different to 10 cents, and if it is only 10 cents there is no need to really sign up right away to avoid the rush.

Kym O'Brien

After carefully re-examining the smaller print we decided that you are actually saving 83.33 cents a month. Our crack unit of mathematicians has pondered this question and it works out to a saving of 9,900% over the mentioned 0.83 cents a month. 9,900% is a pretty stunning amount, so there really is no excuse whatsoever to not get your subscription in before 21 November, when this 9,900% saving (over the previously incorrectly advertised amount) must end. You lucky, lucky Atomicans.

TS ÷ M = RS
(RS – AS) ÷ AS = PD
PD x 100/1 = PI

TS = Total saving
M = Number of months
RS = Real saving
AS = Advertised saving
PD = Percentage difference
PI = Percentage increase

Therefore . . .

$10 ÷ 12 = $0.83 = 83 cents
(83 cents – 0.83 cents) ÷ 0.83 = 99
99 x 100/1 = 9,900% increase

Real power

I, a subscriber of your excellent magazine, am wondering if you could put a section in it that has a state-of-the-art computer – with all the best products, so on and so forth. An example of what I am talking about is The Beast, in the 'other' magazine. Your magazine contains everything required except this one thing. There are also many other readers who have expressed this same point. Please consider my request as it could be a great advantage.
Arun Skariah

No. Because people use PCs for different things. A video editor, for example, would have different requirements than those of a gamer. Futhermore, in the time it takes to print and distribute an issue, better bits invariably come out. And lastly, we review most high-end components, so it's up to you to piece together your own dream machine based on what you need and can afford. Having a 'you wish' box doesn't serve any useful purpose and only frustrates.

And one more thing: the machine you speak of has been missing a couple of important components for the last two years or so, and if ever assembled, it simply wouldn't boot. And while we're at it, if we were to do such a thing, we'd actually assemble and test it, not simply spec the components that are fastest, based on popular opinion and/or whichever company bought us the nicest lunch that month. And the space is better used for real actual useful stuff. And their prices are waaaaay off. That's why.

Golden silence

Your article on baffles (Atomic 8) gave me something to do at work (other than work). But since I could not clutter up my desk with power tools and the like (it would have made it too easy for people to notice I was not working, and some people get upset when you drill holes in metal cases in the office – something about disturbing their concentration?). I just used sticky tape out of the supply cupboard, and cardboard from a box no-one seemed to have a use for (box won't hold much now due to big hole in the side). The whole thing took about 10 minutes, cost nothing and left me with heaps of time left to play Quake all afternoon (Fridays are a little slow).
Lance McCaughan

Clean, wash and polish your CDs

How many people out there have scratched CDs? How many people would like to be able to use them again? And how many people have a CD at home that is scratched, yet still readable sometimes? Well, Fraggs is here to save the day. Now, you could go out and spend some of your GeForce3 money on 'professional' CD cleaning fluid, or you can do what I do and go down to the supermarket and grab yourself a can of Mr Sheen – that's all you need! If you're having trouble finding it on the shelves, look for a red can with a picture of a guy who looks like a young Johnny Howard on it! Just buy the regular Mr Sheen unless, of course, you want your CDs to smell lemon fresh.

You see, Mr Sheen is silicon based. The silicon fills in most of the little scratches. So here's how to fix your CDs (please don't be alarmed): grab an old newspaper or some paper and lay it down somewhere. Then grab the CDs you want fixed or cleaned up and put them on the paper face down. Here comes the scary part. Drown your CDs with Mr Sheen. It will bubble and froth on the CD, but that's normal. Leave it for an hour or so — don't worry, it won't eat away your CD. Just keep an eye on it, making sure it stays covered with Mr Sheen. When you think you have waited long enough, take some tissues (toilet paper works fine, too), fold them and then wipe what's left of the Mr Sheen off the CD. Remember to wipe from the inside to the outside of the CD using clean, dry tissue each time. Hopefully, there'll be no more read errors.
Fraggs

Nice one, Fraggs! Unconventional solutions are the ones we like best. Save money, save your CDs and support the petrochemical industry.

My cat's breath smells like cat food

I'm about to buy a new computer and I'm using your reviews to decide what to get. When I was looking for a graphics card I noticed in Atomic 7 that all the GeForce3 cards (about $1,000) running at 1,280 x 1,024 got between 4,056 and 4,106 in the 3DMark test, but in issue 9 the Suma Platinum K2 ($300) running at 1,280 x 1,024 scored 4,149 in the 3DMark test. Then I realised that the GeForce3 was tested using 3DMark2001 and the Suma Platinum K2 was tested under 3DMark2000. My question is, what is the difference between 3DMark2000 and 3DMark2001, and why don't you use the same test for all the graphics card reviews?
Andrew Strange

3DMark2000 Pro is designed as a DirectX 7.0 benchmark, and does not use the new programmable T&L engine from the GeForce3. 3DMark2001 Pro is a DirectX 8.0 benchmark and it does take advantage of these extra features; in fact, it penalises cards that cannot do what it calls 'Pure Hardware T&L'. Because this essentially includes all of the current cards except the GeForce3 (and the upcoming Radeons), we still use 3DMark2000 Pro for the majority of our testing until there is wider support for DirectX 8.0 features. It is an unfortunate situation, but given that there are also very few game titles that use these features it is unfair to devalue perfectly good cards just because they don't fit into the NVIDIA way of thinking. We will, however, use 3DMark2001 for GeForce3 testing as well as things like SSE2.

The results between the two benchmarks are not comparable in any way, due to the different focus and construction of the programs.

How does $12,000 sound?

The mountain of free stuff is threatening to swamp Ben's desk in a landslide of cardboard and shrink-wrap, so it's time to throw some of the choice picks your way. We've got five XP packs, each containing Windows XP Professional, Office XP Professional and Visio Standard. For the financial analysts out there, that's a smidge under $12,000 worth of software. But wait, there's more!

[Spread the XP Lovin']

We're starting to grow rather fond of XP. Not only will it kill the 'Why are you using bloody Windows 9x for benchmarking?' debate, but it's proving to be a rock-solid, performance-friendly OS. It also uses lots of pretty colours, but we're trying not to let that influence us. Thanks to the ever generous lovelies at Microsoft and August One, we've got five XP packs, containing Windows XP Professional, Office XP Professional and Visio Standard, each valued at $2,400. Of course, we have to make you work for something so valuable:

Q. What was the name of Bill Gates' first company, and with whom did he found it?

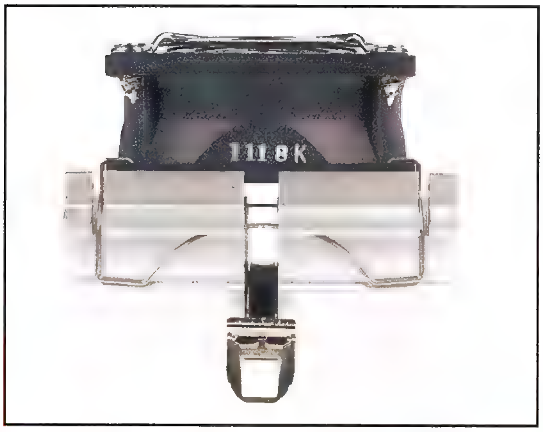
Contact

Please email entries to win@atomicmpc.com.au or post them to Atomic, [Competition Name], PO Box 275, Beaconsfield NSW 2014. The closing date for entries is 21 November 2001. Winners will be announced in Atomic 12. If you enter via email, please provide your full postal address.

[May the Heat Not Be with You]

It's heatsink time once again at Atomic, and this month we've got a couple of lovely heatsinks for two very lucky readers. If you caught our heatsink fan round-up a couple of issues back you'll know that the GlobalWIN WBK-38 blew us away (tee hee), and we've got one of these to give away. We've also got an Alpha PAL6035 for the copper lovers out there. A big thankyou must go out to Below Zero (www.below-0.com) for supplying these units. You don't have to run through the streets on a moonlit night wearing a monkey suit to win; just answer the following question:

Q. How many degrees Celsius (°C) is zero Kelvin (K), and from where does this unit of temperature originate?



Email entries to win@atomicmpc.com.au or post them to Atomic, Competition Name, PO Box 275, Beaconsfield NSW 2014. The closing date for entries is 21 November 2001. Winners will be announced in Atomic 12.

Monkey Business winners: The name of the bar on Melee Island in The Secret of Monkey Island is 'the SCUMM Bar'. A copy of the Gorillaz CD will be winging its way to: F. Canas, Booker Bay, NSW; M. Lake, email; K. Keynes, email; A. Kykkanen, email; M. Cao, Hoppers Crossing, Victoria

The Great Copper Giveaway winners: Copper liquefies at 1,083°C, and the lucky winner of the mega SK6 heatsink fan is A. Fries, email.

You Have Been Summoned winners: If you answered 'the Questing Beast', give yourself a little pat on the back. The following will soon receive a signed limited edition Summoner poster: P. Malyea, email; J. Leong, East St Kilda, Victoria; E. Chow, North Ryde, NSW; F. D'Aguanno, email; M. Young, Inglewood, Victoria; A. Bonavia, Donvale, Victoria

Terms and Conditions of Entry. 1. The promoter is AJB Publishing Pty Ltd (ACN 083 063 914) of Unit 3/5 44-70 Rosehill Street, Redfern NSW 2016. Promotion period is from 9.00am on17.10.01 until 12.00pm on 21.11.01. 2. Entry is open to residents of Australia and New Zealand. Management and employees of AJB Publishing Pty Ltd and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. 3. Enter by posting or emailing forms to AJB Publishing Pty Ltd. 4. The draw will be held at the offices of AJB Publishing Pty Ltd at 5.00pm on 121.11.01. Winners will be notified by mail and published in Atomic 11. The prizes are not transferable or exchangeable and cannot be taken as cash. 6. The judges' decision is final and no correspondence will be entered into. 7. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. 8. All entries will become the property of AJB Publishing Pty Ltd.

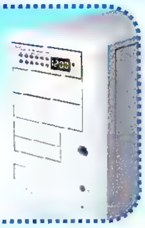
Just Cooler®

Worldwide Patents

Notebook cooling pad

NB-600
Notebook Cooling Pad
Dissipates hot air from the bottom layer of notebooks.

Security system



SS-100
Security System
Power source & Reset locking by PIN. Built-in timer. Ideal for server protection or timed usage control.

Monitor Cooler

MC-100
Monitor Cooler
Maintains air circulation from monitor, serves as a thermal radiation preventer & dioxin odor terminator.

Remote Controller

RC-168 NEW
JUST COOLER
PC REMOTE CONTROLLER

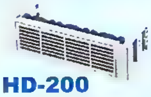
3.5"/5.25" Bay System Cooler

ST-900
Mainboard Cooler
Forces air onto drive bay area to increase system reliability.

TT-900
Reversible Twin-Turbo Cooler
Keeps CD-RW drive cool, essential for reliable recording.

5.25" Bay HDD Cooler

HD-100
2-Fan HDD Cooler

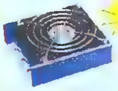


HD-200
3-Fan HDD Cooler

HD-120
2cm thick fan

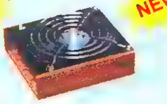
NEW

FC-610S
RAINBLOWER
SYSTEM COOLER
68X73X30mm
Airflow:18CFM



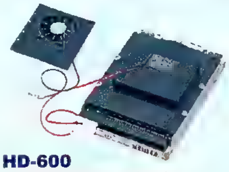
NEW

FC-810S
RAINBLOWER
SYSTEM COOLER
88X93X30mm
Airflow:32CFM

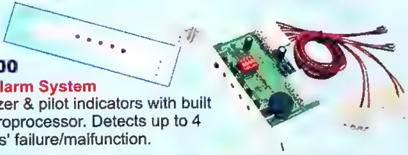


NEW

FC-1200S
RAINBLOWER
SYSTEM COOLER
130X135X30mm
Airflow:90CFM



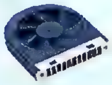
HD-600
Anti-Dust Cover Cooler
A specially designed housing base to prevent system overheating and accumulated dust.



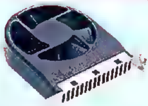
FA-100
Fan Alarm System
A buzzer & pilot indicators with built in microprocessor. Detects up to 4 coolers' failure/malfunction.

System Cooler

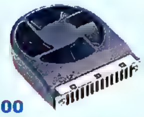
Slim Case Design



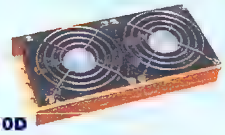
FC-500PS
- FC-500 with installation adapter.
- Fits printer port slot.



FC-100
- Dimension : 120 x 90x 27mm
- Airflow : 32 CFM
- Voltage : DC 12V
- System cooler for Pentium II & A.G.P. Card

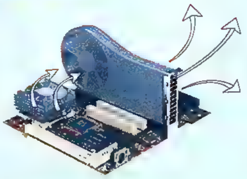


FC-200
- Dimension : 108x 90 x 27mm
- Airflow : 32 CFM
- Voltage : DC 12V
- System cooler for Server, Raid, industrial PC (on SCSI port)

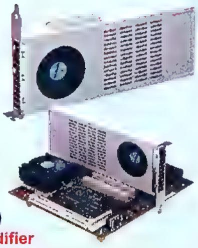


NEW

FC-910D
RAINBLOWER DUAL FAN
SYSTEM COOLER 98X195X30mm
Airflow: 80CFM

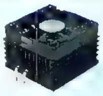


FC-900L
Central System Cooler
Draws heat out from mainboard & PC case.



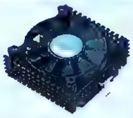
DR-100
Dehumidifier
A specially designed cooling fan which removes moisture from PC mainboards

CPU Cooler / Second Fan

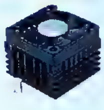


P-925B
For Intel Coppermine FC-PGA Socket up to 1GHz

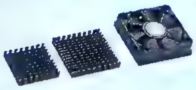
P-22A (Dual Fans)
For ATHLON (AMD K7) & Pentium II-compatible



P-600 (6cm Fan)
For Socket 370
600MHz and up

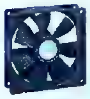


P-500
For Socket 7, Socket 370 500 Mhz and up



CS-100
Chipset cooler for AGP cards, mainboards. Adhesive type

CH-420
AGP card chipset cooler (ball bearing) Clip type



SF-600
(60x60x25mm)

SF-800/SF-800B (Ball bearing)
(80x80x25mm)

SF-801/SF-801B (3 wire)
(80x80x25mm)

SF-900
(92x92x25mm)

P-22SII (Dual Fans)
For SECC II & Pentium III

P-22C (Dual Fans)
For Celeron

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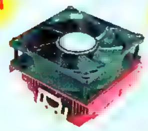

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Soundblaster Live! DE 5.1
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Soundblaster Live! DE 5.1
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16X DVD
Hercules MUSE XL
Creative FPS1500 4.1 Speakers
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tel Pentium IV 1.8GHz	$825
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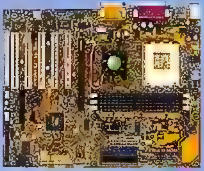

MOTHERBOARDS

sus A7M266 AMD 761	$367
sus A7V266 VIA KT266	$339
sus P4T Intel 850	$412
BIT TH7-RAID Intel 850	$371
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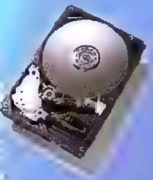
SI K7 Master AMD 761	$340
SI K7T266 Pro VIA KT266	$310
SI 850 Pro2 Intel 850	[illegible]
[illegible] 7DXR AMD 761	$355
[illegible] 7VTX VIA KT133	$263
an Thunder K7 AMD 760MP	[illegible]



HARD DRIVES

[illegible] 20GB [illegible]	[illegible]
[illegible] 40GB [illegible]	$218
IBM Deskstar [illegible]	[illegible]
IBM Deskstar 40GB [illegible]	[illegible]
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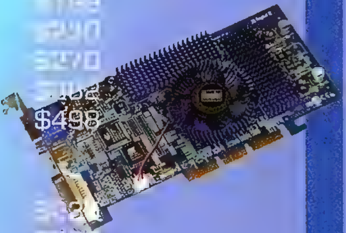
Western Digital 20GB [illegible]	$183
Western Digital 40GB [illegible]	$230
Western Digital [illegible]	$270
Western Digital [illegible]	[illegible]
Western Digital [illegible]	$498



VIDEO CARDS

[illegible]	[illegible]
[illegible]	$169
[illegible]	$110
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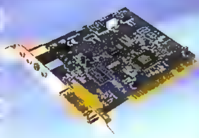
[illegible]	$252
[illegible]	$115
[illegible]	$381
[illegible]	$270
[illegible]	$420
[illegible]	$840



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Creative DTT2200	$299
Creative [illegible]	$604
[illegible]	$410
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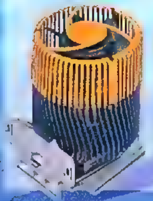

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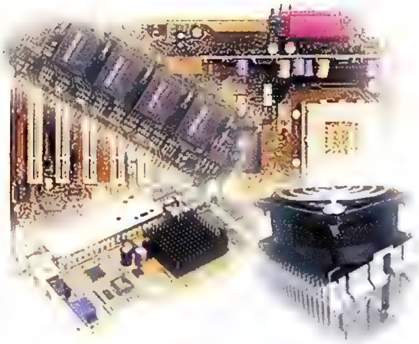

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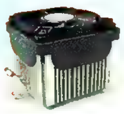

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FrisbeeMark™

During the rare quiet moments in the Atomic Labs, time is usually devoted to coming up with innovative new benchmarking methods in order to objectively measure the immeasurable. Besides our pioneering SolitaireMark ™ system benchmark, TouchyFeelyMark™ mousepad benchmark and the ever popular StenchMark™ method of evaluating new hardware (based on the new car smell concept, but aimed at circuit boards) we have come up with a host of less successful methods that were subsequently discarded after intense testing.

The latest benchmark we want to announce is the creation of FrisbeeMark™. This exciting new concept comes as a result of dealing with yet another motherboard that wouldn't boot up. Reports differ on who actually said it, but the bloodcurdling cry of 'I trust this board about as far as I could throw it' was heard to echo throughout the Labs.

Rather than feel dejected, however, we saw this as a great opportunity for new benchmarking procedures. One of the hardest things to get a scientitistic grip on is reliability. Enter FrisbeeMark™, which puts into practice that age-old cliché of trusting something as far as you can throw it.

The scene for testing was the vacant lot situated behind the Atomic Labs. The necessary gear comprised the products to be tested, an electronic Theodolite (those things worth several thousand dollars that surveyors leave sitting unattended at the side of roads), eye protection (circuit boards can have sharp corners), a windsock, radio for contact with air traffic control (we were optimistic) and a case of beer (we *are* only human).

Our tests were conducted using several items of hardware. Ranging in size and weight, the selection included heatsinks, motherboards, TFT monitors and several ATX cases. Each item was thrown three times, and the results were then averaged and adjusted for wind assistance. To minimise experimental error, the sober member of our team, Chris (aka TBA), the work experience guy, conducted all throws.

Throws were carefully thought out; they involved a smooth overarm action with the product being released at head height. The Theodolite was then used to measure the distance, as accuracy to the millimetre was needed – a normal tape measure was not sufficient.

As the test throws were being conducted we realised that the results would have to be corrected in order to achieve a standard measure of reliability. This stemmed from the fact that a half-kilo lump of copper can fly much further than a much lighter video card. Hence, all items were tested against a reference weight.

The results tallied nicely with what we already knew. For example, think about ATX cases. Everyone knows that shiny, brushed aluminium cases are definitely the most desirable. Thankfully, they also excel at FrisbeeMark™ – they managed a much longer distance than the everyday steel cases. Also, contrary to popular opinion, red cases do not fly faster than black ones. Unfortunately, cases with integrated cooling systems had barely any airtime, and may have done permanent damage to Chris' back.

It was the excellent replicability and experimental accuracy that got us excited about FrisbeeMark™, and we were on the way to the patent office when some unnamed party pooper pointed out that the products we tested were now totally destroyed. For now at least, this has meant an end to our experimentation. However, the team is already on the lookout for a very large padded cell to continue its work in. Any offers are more than welcome.

During a marathon LAN party...
CAPTAIN ATOMIC
...uh-oh...
MARIO 001300 01 WORLD 1-1 TIME 357
Hmmm... BEATABLE BADGUYS AND CYBER PSYLICIBIN .... TRIPPIN' !!!
..SUPER POWERS DON'T APPEAR TO BE...
..WORKING
...inadvertently activates his streaming power and enters his own computer at the sub-atomic level !!!
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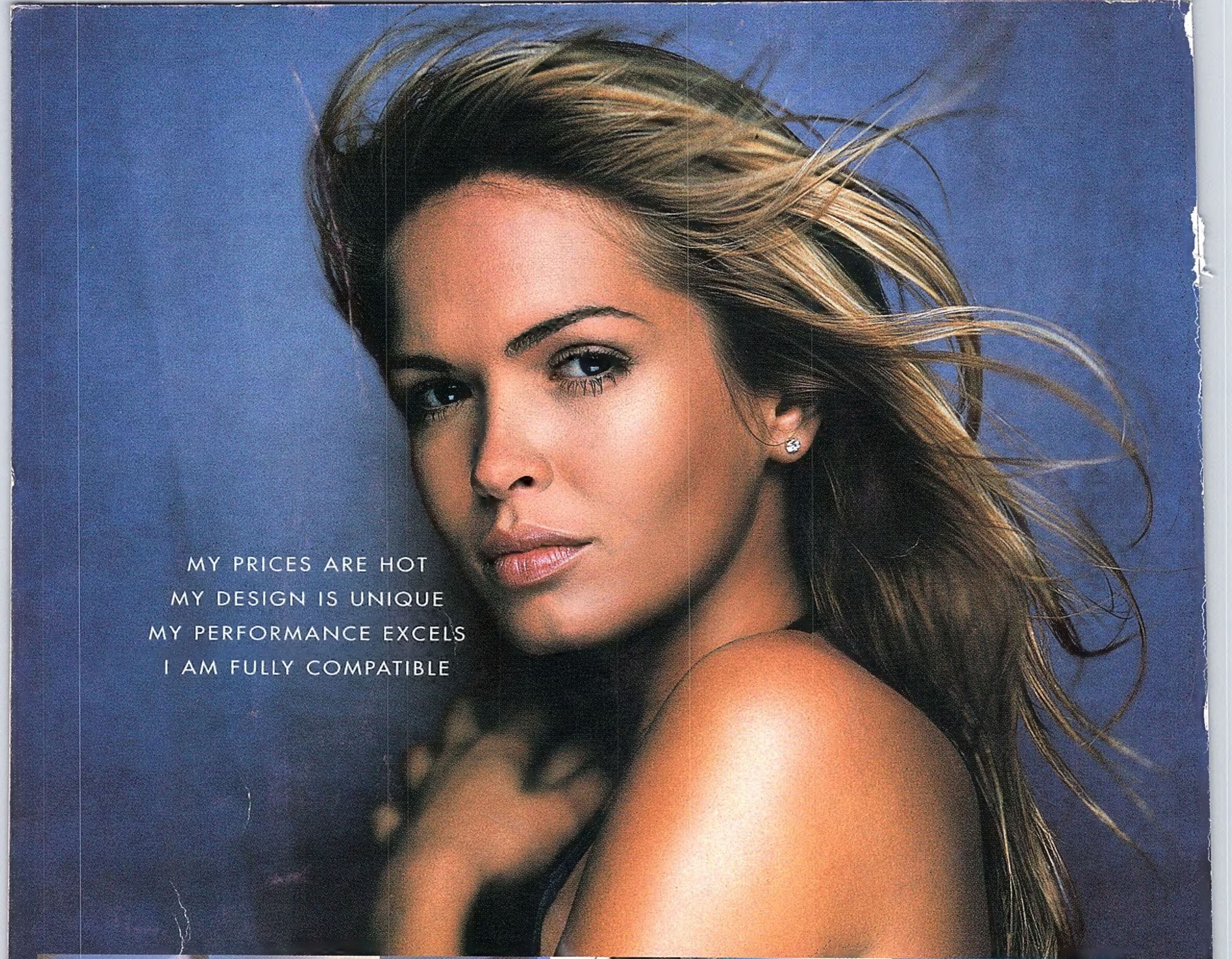

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